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MANAGEMENT IMPLICATIONS OF INTEGRATING VALUES-AT-RISK AND COMMUNITY CONSULTATION WITH THE NORTHWEST TERRITORIES' FOREST FIRE MANAGEMENT POLICY

BY

ALVIN KIM CLARK

A thesis submitted to the faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of

MASTER of SCIENCE

DEPARTMENT OF **FOREST SCIENCE**

EDMONTON, ALBERTA

FALL 1993

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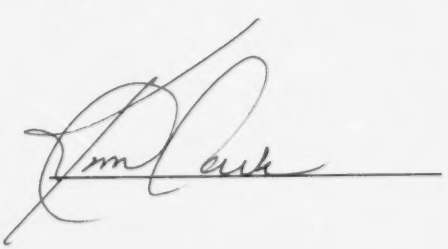
(SIGNED) 

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submitted by **ALVIN KIM CLARK** in partial fulfillment of the requirements for the degree of **MASTER OF SCIENCE.**

Dr Peter J. Murphy, Co-supervisor

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Mr G. Burn Evans

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DATE July 28, 1993

For

Suzanne

Love has launched a billion books

Your love has set the beginning to the rest of our lives

It is a book I have bought

ABSTRACT

In 1979, extensive forest fires burned in the Northwest Territories causing residents to call for a re-evaluation of the priority zone basis of the forest fire control policy. A new policy was developed through public consultation and implemented in 1990. It required that communities be consulted to define priorities for values-at-risk. This study was developed to: 1) define social and environmental resource values (values-at-risk) endangered by forest fires, and to rank them in relative priority, and 2) describe how to more effectively involve the communities and to recognize their values while implementing forest fire management policy. The target population was Dene people, 19 years of age and older, living primarily in small communities of the forested portion of the NWT. Data were to be collected through personal interviews based on a questionnaire. Community leaders in Hay River Reserve, Fort Liard, Snowdrift and Fort Good Hope helped identify the individuals to be interviewed from these communities.

Over 88 percent of respondents wanted all forest fires fought, but there were small groups that indicated that not all fires need necessarily be fought. It was not possible to priorize all values-at-risk identified in the study, but seven values-at-risk (townsite, trapping area, hunting area, petroleum plant, caribou winter range, park area and commercial forest) are ranked with statistical significance. Methods or techniques ranging from open houses and workshops to one on one meetings and letters to resident were ranked as to their importance in community consultation processes. Values-at-risk and community consultation methods were ranked differently among individual communities.

The principle conclusions are: 1) the community itself is the most important value-at-risk, 2) the specific rank order of priorities varied among communities, and 3) this method of seeking community input suggests a workable means for developing a decision framework for community forest fire management planning.

ACKNOWLEDGEMENT

The communities of Hay River Reserve, Fort Liard, Snowdrift and Fort Good Hope gave tremendous support to this study. I cannot express enough thanks to the communities and the community members who were formally interviewed. The Chiefs and Band Councils were especially supportive and helpful in providing me with an introduction to the communities, demographic information and office space when I had a need. A special thanks to Beatrice Lepine for her accommodation of my needs on that first visit to Hay River Reserve and to the North.

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I also thank my supervisory committee, Pete Murphy, Jack Heidt and Burn Evans for letting me guide us through this exploratory sojourn on the wild side of social science.

Howard Cooper loaned me his strength for reviewing literature, directly and indirectly related to the study.

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1.0 INTRODUCTION

In the forested area of the Northwest Territories (NWT) the Territorial government, through the Department of Renewable Resources, is responsible for forest fire suppression. Prior to 1987, the Federal government was responsible through the Department of Indian Affairs and Northern Development (DIAND).

In general, the forested area forms a rough triangle with the Yukon on the west side, British Columbia, Alberta, Saskatchewan, and Manitoba on the south, and then diagonally along the treeline to form a third side (Figure 1). The study took place within this area. There are approximately 1,366,194 square kilometres of forested area (DIAND 1981) in the NWT; this is an area about twice the size of the province of Alberta. Seemingly endless expanses of forested areas are characteristic of the study area. Rowe (1972) describes the seven forest types of the Northwest Territories. They are characterized by extensive areas of continuous vegetation, and all are subject to ignition, burning and rapid spreading. Although most areas have many lakes, ponds and streams, fire may travel easily over these areas by spotting. With few natural fuel breaks fires may develop relatively unimpeded.

The population of the Northwest Territories was estimated at 53,600 (Outcrop 1990); about two thirds of the people live in communities in the forested area. There are 30 established communities within the study area; many of these communities have been threatened by forest fire at one time. The size of the communities range from less than 30 people (Kakisa) to over 12,000 people (Yellowknife). Forest fires and their management probably have the greatest impact on small native communities. Twenty of these small native communities are primarily populated (>85%) by Dene people. In addition, Dene comprise 16.6 percent of the total population of the NWT. For the purposes of the study, the Dene were the target population, as described later.

Janzen (1990)[1] and Murphy (1985)[2] provide comprehensive histories of forest fire and fire protection in the Northwest Territories and in Alberta, respectively.

---

1 Janzen (1990) provided a comprehensive history of fire control history for the NWT. This work forms the basis of the short history recounted here.

2 Murphy (1985) presented a comprehensive history of fire control policy in Alberta. This work is used in conjunction with Janzen (1990) for the historical recount of fire control in the NWT.

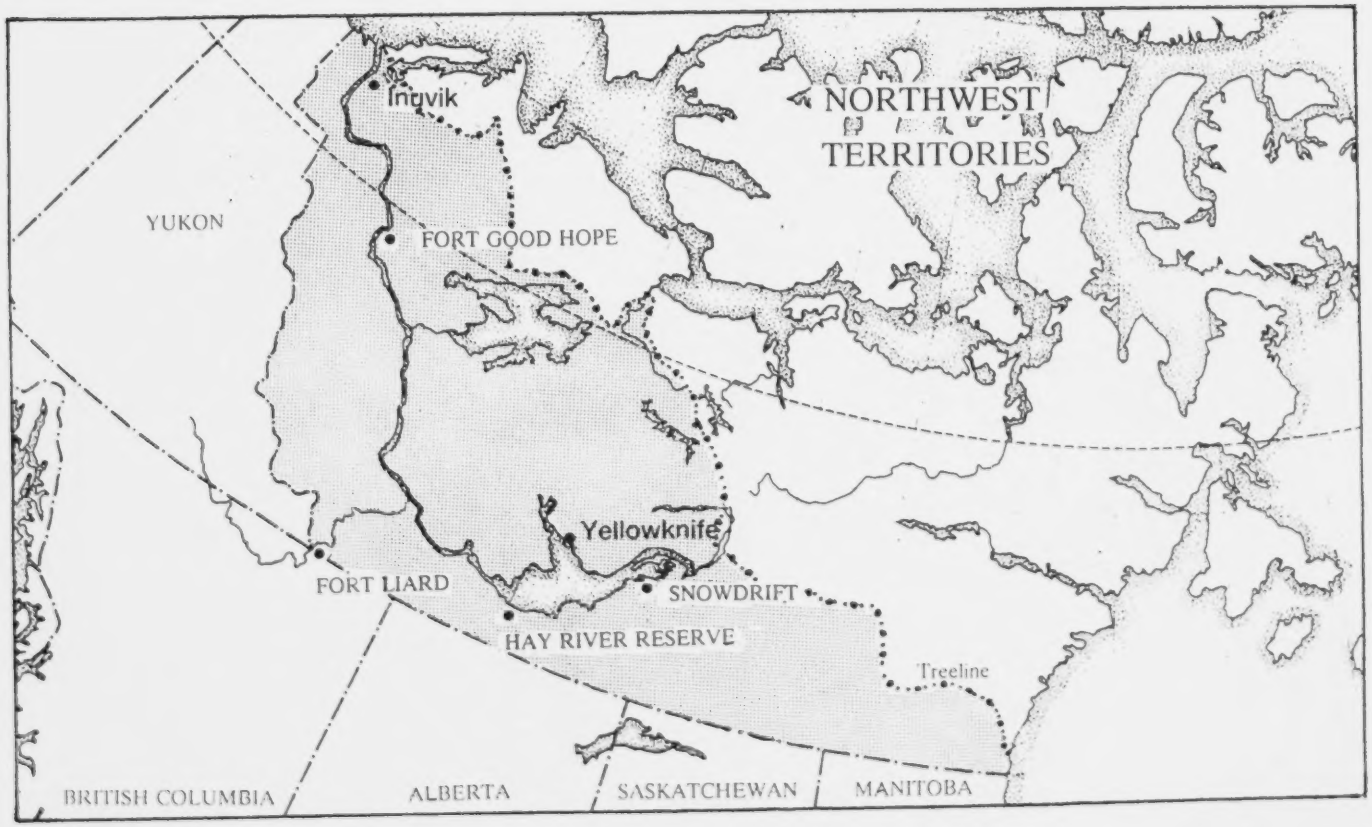


FIGURE 1. Map of western Northwest Territories, Canada. The study area (shaded) and the communities visited are shown.

Janzen tracks the development of forest protection in the far north from pre-recorded history to the 1970s. Murphy provides a detailed look at legislation and policy development leading to Alberta's current fire control program.

1.1 Fire History

Forest fire in the boreal forest predates mankind. Early northern man existed in habitats shaped by recurring forest fires. Aboriginals, as early fire managers, recognized beneficial effects of forest fire and were known to use fire to their advantage (Lewis 1982). Habitat manipulation to help ensure hunting success is an example. The forests during these early times was valued for the sustenance it provided for inhabitants.

The value of forests began to change when Europeans moved into the north. Commercial fur trading grew in importance across the Territories. Native people became aware of the different values, different than providing food, clothing and shelter, the northern forests held for explorers and fur traders. In the European view the destruction of forests, a prime habitat for fur-bearers, was not desirable. Deliberate ignition of the forest was perceived as a direct threat to the fur industry. Traditional burning for habitat modification became a less used management tool as enforcement of fire prevention measures were instituted.

Around the turn of the 20th century rudimentary protection regulations were instituted. These had only limited implementation in the Mackenzie region of the NWT. In 1911, patrols in the NWT posted notices in Cree, Chipewyan and English indicating fires could not be deliberately started (Janzen 1990). Regulation and prevention efforts were largely driven by protection of commercial venture potential including projects relating to fur, minerals and timber.

Under the Dominion Government, limited funding resulted in the withdrawal of fire protection in the Mackenzie region except inside Wood Buffalo Park. This situation existed from 1925 to 1943 (Janzen 1990). Increased lobbying by commercial interests, miners for timber, traders for fur, and eventually pilots for smoke free sky, served as reminders to government of the effects of a nonexistent forest fire protection policy.

The 1940s saw an increasing interest in the north by government, scientists, and business. Government took a first step towards establishing a fire protection agency for NWT and neighbouring Yukon. Harry Holman, with the Dominion Forestry Service, made

recommendations for fire protection directives (Janzen 1990). He encouraged efforts to protect timbered areas and not "wastelands", since blanket coverage was not possible. Poorly timbered, muskeg and transition areas were considered "wasteland", and they tended to include areas traditionally used by northern residents for trapping or hunting. Local forestry officials also felt these areas were important and there should be protection afforded to them. The differences in priorities between Native northerners and European southerners would continue to be an issue. Northerners saw this as an example of southerners who had control over resources about which they had little knowledge.

Divergent views characterized policy during the 1950s, 60s, and 70s (Janzen 1990). During the 1950s, demands by northeners to protect portions of the barren-ground caribou range went unsatisfied due largely to the great cost and the remoteness of the areas.

Directives indicated that communities and timbered areas in the Wood Buffalo Park could be protected. A clear fire control policy was needed. At the beginning of the 1960s, northerners indicated that government should recognize the value of forests to its inhabitants and not just to developers, conservationists and lumbering interests. In the mid 1960s, the Federal Government formed the Department of Indian Affairs and Northern Development and in 1967 the first formal fire control concept was introduced. Forest fire management was predicated on a priority zone strategy. In part, control priorities were based on community protection and potential timber and other revenue-producing resources of the land. The land and resource values were identified by the Mackenzie Forest Service, a Federal agency. This was perceived by northerners as a continuance of the practice of southerners and Ottawa officials directing matters of local importance and concern.

1.2 Priority Zone Policy

In 1973, prompted by a serious forest fire season in 1971, a formalized fire control policy was developed and implemented which included four priority zones (DIAND 1973).

Priority Zone 1 identified main communities (> 25 people) and their immediate environs as important values to be protected. Areas up to 32 kilometres from a community were considered as part of the zone. Fire actions were initiated to quickly control fires which threatened life and property.

Values to be protected in Zone 2 included smaller communities, active mines, commercial lodges, accessible merchantable timber and a narrow strip along communication and highway corridors. Areas of up to 3.25 kilometres from small communities, mines or lodges were recognized for protection. Decisions regarding fire actions in Zone 2 had restrictions that included the requirement to justify efforts based on assessments of manpower and equipment availability, operational feasibility, anticipated long and short term effects of the fire and the alternative uses of limited presuppression and suppression funds (DIAND 1981). Managers recognized that it was possible for resources to be totally committed in Zone 1 and therefore be unavailable for use in other zones.

The majority of natural resources valued by aboriginal northerners were classified in Zone 3. Included were values such as habitat for commercial and endangered wildlife species and trapping, recreational, other timber, and watershed areas. Fire action objectives were the same as for Zone 2, but managers realized that Zone 3 fires might not be discovered in a timely manner and that fire control resources might not be available.

Zone 4 included the rest of the forest and tundra areas and was largely considered a non-protected zone. Fires in Zone 4 could receive action if they directly threatened high value resources in other zones.

Through the 1970s, funding constraints forced government to reduce the amount of area protected and to effectively abandon priority zone three (DIAND 1981). By 1979, approximately 166,700 square kilometres remained of the 343,100 square kilometres protected in 1975 (DIAND 1981). Decisions were still being made from Ottawa.

The devolution of power and responsibility from federal agencies to territorial agencies occurred during the 1980s (Abele 1990). The Territories had sought control over forest fire management since 1980 (Abele 1990). A major impetus towards seeking control was the extensive fires of 1979, and the perceived failure of the priority zone policy to adequately protect resources (Abele 1990). During and following these fires, residents of the NWT felt betrayed by a government that apparently did not care about issues important to those communities close to the land. Public action by aboriginal groups, hunting and trapping associations, and other concerned citizens led to the appointment of a Fire Review Panel by the Federal Minister. The Review Panel visited 18 communities during the winter months of 1979/80 as part of its review of the federal forest fire policy and program. A key area in their investigations was the priority zone policy.

One of the Panel's major recommendations was for increased public participation in policy development. Another major recommendation was to scrap the priority zone policy, as it appeared to have been totally discredited.

There was a clear expectation by residents that the zones would be eliminated and more fires would be fought. The raised expectations put pressure on the fire management program to find ways to accommodate this 'demand' within existing budgets (GNWT 1992). As suggested by the Review Panel, an advisory council was formed and began work towards defining forest fire management policy.

The priority zone policy, with added flexibility attributable to public demand and the Panel's recommendations, was in effect until 1987. Under the terms of devolution agreements, the policy remained in place for three more years to 1990 (a transitional phase). This interval allowed the Territorial Government time to develop and put in place a 'Made in the NWT' forest fire management policy.

1.3 NWT Forest Fire Management Policy

The new policy was developed by pursuing consultations involving the advisory council, communities, other residents of the NWT, and forest fire program managers. This process culminated in a new Forest Fire Management Policy (FFMP) document which was put in place July 1990.

The policy differed from previous policy in that there were no priority zones. In brief, the FFMP required that the following six criteria be considered for each forest fire when making a decision about fire control (GNWT 1990):

a. Values-at-risk (based on the following hierarchy)

   i. Human Life,
   ii. Property (communities, and other man-made infrastructure),
   iii. Renewable Resource Values (e.g. primary wildlife harvesting areas, commercial timber areas, endangered species areas),
   iv. Cultural Resource Values (e.g. historic or archaeological sites, culturally significant areas);

b. Land and resource management objectives;
c. Availability of personnel and equipment;
d. Fire weather;
e. Fire risk in higher-valued areas; and
f. Where property or resources are threatened, the relative value of that being threatened.

Although the policy appeared to be conceptually valid, it required further definition before it could be operationally applied.

Stated in the policy was the guiding principle that the communities must be consulted on all aspects of forest fire management. The Northwest Territories governs itself by building consensus (Outcrop 1991). Community involvement in policy development could be very important.In January 1990, a Public Discussion Paper was circulated and input on a forest fire management policy was sought. There were few replies from residents, although the Discussion Paper was widely circulated to provide opportunity for input. This raised questions about the effectiveness of the public involvement process.

Communities could have a direct impact on fire control operations, for example, by defining local values-at-risk (Appendix 1) or by setting objectives for forest land use in their regions. Renewable Resource Officers had been working with communities to try to identify values-at-risk and land management objectives. Definition and location of values-at-risk were on-going as an operational component of fire management but the task had not yet been completed. As well, there had been no ranking of identified values-at-risk. These undertakings had to be done in an objective and acceptable manner.

1.4 Objectives of Study

There were two primary objectives for the study. Through extensive community consultation:

1. To define social and environmental resource values (values-at-risk) endangered by forest fires, and to rank them in relative priority, and
2. To describe how to more effectively involve the communities and to recognize their values while implementing forest fire management policy.

2.0 Literature Review - Values-at-Risk

In 1990, the Government of the Northwest Territories (NWT) introduced a new forest fire management policy. Unlike the previous priority zone policy, all forest fires in the NWT were to receive a response based on consideration of several criteria (GNWT 1990). The first criteria was 'values-at-risk'. The policy demanded a concentrated effort by the staff of the Department of Renewable Resources to consult with the communities to clearly define important resources, although values-at-risk had been a component of earlier forest fire suppression strategy. Community consultation was one of the guiding principles of the policy. A literature review was undertaken as part of a research project that attempted to rank values-at-risk. The following highlights the background to the development of values-at-risk relating to forest fires.

To begin, a definition will help ensure a clear understanding of 'values-at-risk' throughout this review. In its broadest context, values-at-risk refers to anything that may be destroyed or changed by a forest fire. A slightly narrower and probably more utilitarian definition would be: anything, valued by people, that may be destroyed or altered by forest fire. We have previously tended to value things by relating how much money we would lose if they were lost to fire. Recent environmental awareness has helped us become more comfortable understanding value in those things that do not readily lend themselves to market-pricing (wildlife and scenic nature as examples). For the purpose of this review, values-at-risk are defined as all and any thing that may be destroyed or otherwise altered by forest fire. This definition is consistent with the policy definition (GNWT 1990).

Aldo Leopold is recognized as one of the early environmentalists. In his Sand County Almanac (Leopold 1949) he described a 'land ethic', and he stated that man's use of the environment should be one that is kinder to the ecosystem. In 1936, Leopold wrote a letter to the Editor-in-Chief of the Journal of Forestry characterizing the value of wilderness as being 'sensed in your bones'. He maintained that no one can 'learn that value through any process of logic or education' (Leopold 1936). In this sense he seems to have been saying that there is a spiritual value to wilderness. Many individuals have similar impressions of the value of our ecosystems and, in particular, our forests. Management strategies this decade may provide a desired blend of utilization and preservation where all values-at-risk are recognized and effectively managed.

The expansion decades (1960s and 1970s) saw forest fire protection organizations assign fire management priorities to things that reflected a market price or value. Those things that could be easily recognized or valued in dollars were protected. In general, the first priority was to safeguard life and property within the community. Other priorities were protected based on the availability of resources. In 1979, de Lestard outlined a system of priority zones and important resources that were to be protected within each zone. The values protected and the possible fire actions have been described previously.

In the 1980s, and especially the 1990s, several trends had substantial effect on forest fire fighting organizations. Two of the more important trends were: increasing environmental awareness, and diminishing operating budgets. Agencies found it necessary to juggle extra protection for environmental value and the higher associated cost with fewer dollars.

Rolston, III (1981) stated that forests provide much more value than just economic returns from extracting resources (timber, forage, water, game, etc.). He suggested values appear in human response to the world, and are actualized in human relationships with nature. Besides economic value, he included recreational, scientific, aesthetic, life support, wildlife, diversity, stability. dialectical, and sacramental values as being present in the forest. Rolston, III (1987) noted with regards to the ten values above that these values are hard to measure in the traditional market-place context. For example, what value could be assigned for the forest supporting all life, for the knowledge lost with extinction, for the vital food chains, for the religious-like experiences or for the uniqueness of the only forest in the solar system? Forest fire protection organizations must struggle to deal with such value concepts while managing with fewer dollars.

Wiitala (1983) suggested that forest fire fighting organizations need to rethink the values-at-risk concept. He suggested one of the main reasons for management by values-at-risk was the need 'to have an operational definition for valuing fire protection outputs'. In short, was the money spent on fire fighting being spent wisely or at least could it be justified? Wiitala went on to suggest that the 'the change in value or net social benefit that results from a fire' is value-at-risk. By identifying all impacts that could be changed by a fire event a value-at-risk may be established. This definition of values-at-risk is very broad.

Wiitala argued that this is different than net value change (NVC) as NVC is 'the aggregate expected value at risk' and there cannot be a formal basis for establishing NVC without the fundamental values-at-risk. Baumgartner and Marty (1988) attempt to show how, by using available information, values-at-risk and NVC may be used to assess potential for large wildland fires.

As the 1980s came to a close, non-extractable or social values such as air and scenic quality, open spaces, and recreation opportunities had become more and more important to the general public. It was not so much that these were new values, but more that there was a new and strong political efficacy (Shannon 1988). New migrants to rural areas put higher relative priority on environmental quality. The forest became very valuable real estate with the surge in environmentalism. Along with traditional values like timber for harvesting and forage for grazing, other values, such as habitat for wildlife and natural virgin vegetation for spiritual experience, were accorded priority. Decker (1989) described the value in wildlife as not unlike the values in forests or wilderness. He maintained there is economic, social, scientific, biological, etc., value that should be managed. Schroeder (1988) described the psychological and cultural effects of forests on people. He suggested natural vegetation promotes relaxation and recuperation. There is also a wealth of value in traditions or myths about the forest.

Environmental quality has emerged as a priority to many individuals and groups for this decade. Managers of fire control agencies must overcome existing fundamental or core values in order to effectively manage forests in the future. Allin (1990) and Wellman (1990) discussed the development of the United States Forest Service and to a lesser extent the United States Parks Service. Each agency had unique beginnings and founding fathers, so to speak. The Forest Service began under the premise that the forest was there to be used for the benefit of society. Gifford Pinchot, the first head of the Forest Service and the founder of the Society of American Foresters, had a utilitarian vision for those forests set aside as forest reserves across the nation. This vision has been pursued since the late 1800s by the U.S. Forest Service. It is not unreasonable to expect the professionals working in forestry to have a utilitarian bias and to favour use of extractable or tangible resources for the benefit of society. The Parks Service began, in part, under military control. The military was used to enforce the regulations in isolated reserve lands. This may have instilled a protectionist or preservationist bias throughout the Service. Managers must be aware of the

historical development and recognize they may possess biases. They must be able to set their biases aside and be flexible when considering land-use scenarios for the forests they manage.

Along with the environmental priority there is a growing desire by the public to be more involved in forest management decision-making. It is paramount that the owners and users of the forest are involved in setting forest fire management policies. The public, in many cases, owns the forest land base. Their definition of values should be part of forest fire management plans. Knopp and Caldbeck (1990) suggested that public involvement should happen along a continuum. Input should be solicited at various stages of planning. The public is exerting pressure on professionals by expressing distrust. More and more, the public is demanding accountability from the professionals, and they are expecting to be effectively included in any process of policy development for managing forest land.

Sociologists have taken a renewed interest in the forest sector due, in part, to public individuals and groups becoming so combative with governments and private sector corporations. Field and Burch (1990) suggested that values and attitudes about the forest are first vested with the community. Agencies must strive to understand concerns and to include community members in management. Rolston, III and Coufal (1991) maintained that values continue to evolve. With changing values, policies will need to change to accommodate the time and situation. The ten types of values (Rolston, III 1981) are still valid although they are more equally ranked in the 1990s. In a sense, management must be 'multiple-value', as well as multiple-use oriented. There is a 'new' perspective emerging that includes caring or harmony between man and the land similar in tone to Leopold's land ethic. The global village is considering the concept of sustainability.

The publication Our Common Future (WCED 1987), in the 1980s gave the global society a push towards the adoption of a stronger environmental consciousness. Our consciousness, now awakened could provide for future generations of humans on this planet. One of the main concepts adopted was 'sustainability' or the use or consumption of resources now, without compromising the quantity or quality of resources for future generations (WCED 1987). Gale and Cordray (1991) proposed eight answers when asked what forests should sustain. The answers are linked to extractable and non-extractable values. Each answer relates to a relatively distinct approach to forest management for sustainability, 2) community sustainability, 3) human benefit sustainability, 4) global

sustainability, 5) self-sufficient sustainability, 6) ecosystem type sustainability, 7) ecosystem insurance sustainability, and 8) ecosystem-centred sustainability. Values-at-risk such as timber, range, and water, the extractable resource types, would tend to be priorized and protected in the first three management approaches above. Values-at-risk such as those inherent to ecosystem integrity, the non-extractable resource types, would tend to be priorized in approaches five and six. Approach seven would tend to priorize, in a buffer area, specific species or diversity in the ecosystem. Utilization of products on a sustained yield basis could take place outside the buffer area. Approach four would lead to protection of values that are unique in a global context. These values could be specific forest ecosystems or unique forest products required by the global village. In approach eight there would not be fire protection, as a 'let burn' policy would be adopted. The ecosystem would evolve without any or with very minimal input from man. One or several of these approaches may be involved as part of a management strategy for any given area. Any value-at-risk could be given a different priority in another area or another time depending upon the management approach(es) adopted. Approaches four through seven may become the most acceptable management strategies in the future given recent trends towards environmental consciousness.

Value-at-risk is a human manifestation that reflects worth attached to our surroundings. Values-at-risk may be ranked or priorized differently among communities. In this respect the initial identification and priorization of values-at-risk is probably, first, vested with the community. This is not to say that national or global priorities will not be imposed on local areas.

The growing desire and demand by the public to be more involved in decision-making processes may be one of the most important issues facing managers in this decade. Forest fire management policy should be successful if it is developed in concert with the community. This should be especially true if community land use objectives are incorporated into the policy. Incorporation of community objectives may help ensure support for and acceptance of policy. Social or cultural acceptance is a major consideration in policy analysis (Clawson 1975). Identification and priorization of values-at-risk through sincere community consultation should help managers develop effective forest fire management policy.

3.0 METHODOLOGY

Forest types in the Northwest Territories are varied, but virtually all are flammable and subject to ignition and burning (DIAND 1981). In the Northwest Territories, the territorial government is responsible for forest fire protection. Forest fire management policy was developed to try to provide communities and other identified values-at-risk with protection from wildfire. The concept of priorizing values-at-risk or setting a hierarchy of values was established in the NWT Forest Fire Management Policy (GNWT 1990). It was recognized as important that community members be involved in the identification of values and the development of priorities. Community consultation was one of the fundamental principles in the evolution of policy.

This research study was designed to attempt to develop a relative ranking of values-at-risk from the communities' perspective. The methodology is described in this section. There are six main components: 1) Location of the study area, 2) Communities involved, 3) Individuals involved, 4) Research Instrument, 5) Application of Social Science, and 6) Analysis.

3.1 Location of the Study Area

The forested portions are the areas of concern to the fire operations agency of the Government of the Northwest Territories. Forests lie largely to the southwest and along the Mackenzie River Valley (DIAND 1981). The barrens, mostly unforested, lie beyond the tree line to the east and north, and are not a concern with respect to fire. Forest fire in the territories probably has the most impact on small communities established in the forested areas (Figure 1). The population of these communities was primarily Dene.

3.2 Communities Involved

There are 30 communities in the forested area of NWT. With the exception of the larger centres of Yellowknife, Inuvik, Hay River Town and Fort Smith, the communities have less than one thousand members; many communities have less than three hundred members. In twenty communities, more than 85 percent of the population are Dene people. Time and resources would not allow all people and all communities of the NWT to be sampled. Five communities, giving due consideration to time and resources, were chosen: Hay River

Reserve, Fort Liard, Snowdrift, Fort Good Hope and Snare Lakes. These five communities were selected based on a number of conditions established for the study. The following conditions or factors were considered when choosing the communities: number of communities required, representation of target population, culture or customs, different geographic areas, diverse forest types, varied accessibility, different developmental history, and modern technologies. Each factor is discussed briefly in the following paragraphs.

Snare Lakes was subsequently dropped from the study. Snare Lakes was the most remote of the selected communities. Difficulties in contacting and securing a meeting with a community leader could not be overcome in the time or with the financial resources available to the project.

Permission from and support of the Chief and Band Councillors was sought and obtained for each community involved in the study. This helped legitimize the study and fostered a willingness to participate among community members.

3.2.1 Number of Communities

The communities chosen were intended to represent different cultural, geographic, and developmental history regions of the forested area and collectively they were to be representative of the target population. Four or five carefully chosen communities could meet these requirements

3.2.2 Representative of the Target Population

The target population was defined as Dene people, nineteen years of age or older, and resident in the forested area of the NWT. The Dene Indian, during the last 2,500 years and prior to European exploration, inhabited the forests and barrens of continental Northwest Territories (Outcrop 1990). Today, they continue to live in areas traditionally used by their ancestors. Dene people comprise the largest segment of the population in the small communities of the forested area.

An age grouping of nineteen and older was chosen for several reasons. First, individuals had to be able to answer the questions. Second, respondents were expected to represent the broadest range of possible attitudes or values. Third, the age range established the sampling boundaries for the study. Discussions with contacts in the study area helped narrow the age grouping to nineteen and over.

The range was confirmed during the course of discussions and observations within the communities. Respondents seemed to identify three general groups of people: kids, aged to their late teens, boys, aged to their mid twenties, and adults. Boys seemed to earn some respect from adults for their abilities, especially if they were actively pursuing a living from the land. Adults were a two part group; one segment included most adults, and the other smaller segment included the elders. Elders were older individuals who had earned much respect from the whole community. The groupings were not as clear with respect to girls.

3.2.3 Culture or Customs

Values and attitudes are formed as people experience life in the society around them. Values, higher-order constructs than attitudes, are more permanent and resistant to change (Mueller 1986). Different cultures or customs may lead to formulation of different values and attitudes. Many cultures and customs, including modern Western cultures, as well as traditional Aboriginal cultures, thrive in the study area. The NWT Data Book 1990/91 (Outcrop 1991) identified at least five different native cultures or linguistic groups within the forested areas. Identified were Metis, and among the Dene People there were Chipewyan, Dogrib, Kutchin (Gwich'in) and Slavey. Dene (1984) indicated the Hareskin people are the fifth cultural group of Dene. Dene culture or linguistic areas can be defined by geographic areas (Outcrop 1990). Table 1 summarizes the primary cultural groups of the communities visited. Snare Lakes was predominately Dogrib.

3.2.4 Geographic Areas

Geographic location may also have some bearing on values or attitudes expressed by communities. As well, the nature and value of forests change with different geographic areas. The five communities chosen are found in different geographic locations. The mountains, the great lake basins, the river valleys, and the cardinal directions are represented by the selected communities (Table 1).

TABLE 1. Summary of cultural or linguistic groups and geographic locations represented by the selected communities.

	Culture	Latitude	Longitude	Geography
Hay River Reserve	Slavey	south	centre	lake/river
Fort Liard	Slavey	south	west	mountain
Snowdrift	Chipewyan	centre	east	lake
Fort Good Hope	Hareskin	north	centre	river

3.2.5 Forest Types

Forest types, and the flora and fauna associated with them at various stages of ecological succession, help to shape traditional ways and perhaps values. For example, in the eastern transitional areas, forest to barrens, caribou play a major role in community life, and in the western mountain areas, with sizable timber in the river valleys, moose play an important role. The Mackenzie River Valley nurtures white spruce forests, while on the highlands away from the river, the forest is comprised of black spruce on permafrost with lichen communities and muskeg. Transitional areas have continuity of vegetation including lichen ground cover, shrubs, black spruce or jack pine (DIAND 1981). Rowe (1972) outlines seven distinct forest types found in the boreal forest region of the Northwest Territories. He calls these types: Hay River, Upper Mackenzie, Lower Mackenzie, Upper Liard, Northern Transition, Forest-Tundra and Alpine Forest-Tundra. Their names hint at the general geographic location. Table 2 summarizes key features of the forest and indicates which communities are found in or near each forest type.

3.2.6 Accessibility

The accessibility of the community to travellers and migrants may have a bearing on the degree of outside influence on community values and attitudes. Culture and tradition may be affected by new community members. Communities that have well developed access (road systems) may have different attitudes than communities that are inaccessible. The five communities represent a spectrum of access from paved highway access to no vehicle access (Table 3). Year round access has been developed into Fort Liard in recent times. The provision of access has been a harbinger of development and the associated social benefits and costs.

TABLE 2. Summary of forest types in Northwest Territories*.

Forest type	Key features	Community
Hay River	Black spruce covers large portion. Growth not as good as mixed wood area further south.	HR
Up. Mackenzie	Some of the best timber producing lands of the NWT. White spruce and Balsam Poplar are main types on river flood plain. Jack and Lodgepole Pine and Aspen in sandy locations above the flood plain. Black spruce and larch are found in wet areas above flood plains.	HR, FL
Lr. Mackenzie	Conditions dictated by permafrost. White spruce of sawlog size on well drained bench land where permafrost is not high. Mostly growth is poor. Scrubby forests of willow, alder and stunted white and black spruce. There are great expanses of stunted black spruce forest on the flat, poorly drained terrain.	FGH
Up. Liard	Good forest growth. White spruce/balsam poplar on alluvial flats. Black spruce and Lodgepole pine found above the flood plain. Alpine fir may be found at higher elevations.	FL
N. Transition	Areas of bog, muskeg and barren rock are intermixed with open stands of dwarfed trees. Black spruce is the most abundant. Ground cover of lichens giving parklike characteristic to stands.	SN, FGH
Forest-Tundra	Tundra, barrens and patches of stunted forests. Trees usually found at shores of lakes and rivers. Mostly Black spruce but also white spruce, larch, birches, alder and willows.	SN
Alpine-For-Tu	Open park-like stands of stunted white spruce.	FL, FGH

* Summarized from Rowe (1972)

Hay River (HR), Fort Liard (FL), Snowdrift (SN), Fort Good Hope (FGH), Upper (Up), Lower (Lr) Northern (N) Alpine-Forest-Tundra (Alpine-For-Tu)

TABLE 3. Summary of types of community access.

	Road	Surface	Air
Hay River Reserve	highway	paved	jet services
Fort Liard	highway	gravel	small twin
Snowdrift	nil	nil	small twin
Fort Good Hope	winter	ice	small twin

3.2.7 Development History

Community development may have some affect on values or attitudes. Community development, from a European perspective, may be evaluated by the type of facilities, amenities, services, or businesses established in the community. Development opens the door to technological opportunities for the communities to utilize. The introduction of telephone, FAX and computer in some communities has helped open communications with a more modern world, and consequently, has introduced the communities to different concepts.

3.2.8 Modern Technologies

Community members have an intimate understanding of themselves and of their environment. Modern technologies may help them more clearly define their environment. Recent use of satellite imaging and Geographic Information Systems (GIS) in several of the communities has provided an opportunity to describe forest and land management potential in detail that was unavailable in the past. How much this will affect attitudes and values is not known.

3.3 Individuals Involved

The Northwest Territories Data Book 1990/91 (Outcrop 1991) was used to approximate age class demographics and estimate the target and sample populations for the study. The Data Book is a complete information guide to the NWT and its communities. It is updated and published annually.

3.3.1 Dene

The target population was defined as all Dene, nineteen years of age or older. This unit of the population included both male and female candidates. As well, use of interpreters made it possible to include those individuals unable to speak English. The study was designed to represent individuals as close to the relative demographic profile as possible. The Dene represent 16.6 percent of the total population of the NWT or 8900 people. In 1989, the Government estimated the population of the Northwest Territories to be 53,600. Approximately 62 percent of the total population were over eighteen years of age. The target population of Dene was estimated at 5500.

The five communities had 774 possible candidates. The sample size was 70, after Snare Lakes was dropped from the study. The actual number of target group interviews completed was 65 (Table 4). The sample size was felt to be adequate for several reasons. First, the target population was considered to be fairly homogeneous, and values or attitudes expressed were expected to be similar (pretest of instrument indicated homogeneity). Second, the communities, as an element of the consultation component, chose most of the candidates that took part in the study.

The choice of candidates was facilitated in several stages. First, a contact in the community was approached. This person was a Band Manager, a Renewable Resource Officer, or an individual active in the community. Discussions with this contact led to the identification of individuals in the community that would be important to include in the study. Second, the contact person introduced the researcher to the Chief and Band Councillors, as well as other persons active in the community. Third, after discussions with these individuals, the researcher had several lists of possible candidates. Those whose names were duplicated on two or more lists became primary candidates; the others became secondary but not less important. Un-named residents were also included in the study and were selected by way of systematic house-visits. The homes of community members interviewed were marked on a community map. A sample of every ith home was then selected from the remaining unmarked homes where the sample needed augmenting. Augmentation was necessary because individuals from the primary or secondary lists were not always available (out of town, busy, not wishing to participate). All eligible candidates therefore had a chance to be part of the study.

TABLE 4. Summary of number of interviews conducted and days in the communities.

Community	Number of Interviews Target	Non-target	Total	Days
Hay River	13	1	14	15
Fort Liard	17	3	20	15
Snowdrift	14	1	15	16
Fort Good Hope	21	1	22	13
Norman Wells		1	1	2
Yellowknife		1	1	5
Fort Simpson		1	1	3
Totals	65	9	74	69

3.3.2 Non-target Group

A small group of individuals (9) were interviewed during the field season that were not from the target population. These individuals were either from government and were directly involved with forest fire management or they were from the community and were directly responsible for community administration. They are referred to as the non-target group throughout the paper. Table 4 indicates where these individuals were interviewed.

It was thought, by participants and contacts, that individuals or groups not included in the target population may express different attitudes and perceptions about fighting forest fires. As the spirit of open and comprehensive consultation was a primary principle of the study an effort was made to include these viewpoints. The non-target group respondents were selected by the researcher on a "first come first interviewed basis". Any representativeness of the results from the non-target group data should be interpreted carefully.

3.4 Research Instrument - the Interview Form

The research instrument was developed to help ensure that all candidates could contribute to the study in a way in which each felt most comfortable. The following describes three components of the instrument: 1) the type and reasons for the format chosen, 2) the question and interview form development, and 3) the application of the interview. The application of the pre-test is also described.

3.4.1 Type and Reasons for the Format

A personal interview was chosen as the research instrument. The choice was made for several reasons. First, the study proposed that values-at-risk be priorized, at least in part, from the perspective of members of the community. The personal interview seems to embody the concept of community consultation, a principle of the Forest Fire Management Policy, better than a somewhat impersonal written survey. A telephone survey was also considered too impersonal and inappropriate. Further, there were a limited number of residents with telephones and language barriers would cause difficulties over the phone.

Second, it was important to include a representation of all possible candidates. This meant that some individuals, not able to read or write the English language well, would be excluded. A survey written in Dene would have had the same problem; some individuals did not read or write Dene well.

Third, the limited access to some communities and the traditional nature of the life style suggested a mail survey would take substantial time to collect a reasonable number of responses, if any at all.

3.4.2 Question and Interview Form Development

Questions were designed to try to solicit responses that would help better understand the individuals relative ranking of values-at-risk and help identify important community consultation techniques. Copies of the questionnaires are in Appendix 2. Values-at-risk have been articulated by communities and government agencies but neither have clearly expressed what order of importance values-at-risk take. In this study, questions were asked to collect community members' ideas of how important each value-at-risk was to them. Three types of questions were asked to help quantify importance among values-at-risk: a) the ranking of values-at-risk from most important to least important, b) the ranking of five selected values-at-risk from 1 (first to protect from forest fire) to 5 (last to protect from forest fire), and c) the choosing between two selected values-at-risk to be protected. All values-at-risk were identified in previous work as being important but some were expected to be more important than others. Respondents were asked to make a choice and to articulate the difference. Asking respondents to make a choice between important values-at-risk could cause discomfort, so an open comment section to allow explanations was provided for each question. Respondents could elaborate on their choice and add comments

or more information should they desire. Appendix 3 indicates all comments as recorded in the interviews.

A draft set of questions was initially prepared on the basis of the literature review and consultations. These were refined after discussions with individuals from the study area and supervisory committee members. A draft comprehensive interview format was developed, and a pre-test in a typical community was conducted.

Prior to any formal interviews, a group of community members in the study area were asked to evaluate the questions. The group suggested changes that led to streamlining and ease of understanding.

After the pre-test experience, three formats of the interview were developed: long form, short form, and elder's form. The long form was comprised of all the pre-tested questions, and it was intended for extensive interviewing with primary candidates. Questions asked were both qualitative and quantitative. The short form used questions from the full interview, and was intended as a format to include respondents, other than primary candidates who wished to participate or who were selected in random house visits sampling. Questions were primarily quantitative with open comment sections for respondents to detail their responses. The elder form had several questions that could be easily translated into Dene. Questions asked about forest fires in general, including past memories and recent events. When interviewing elders or those individuals uncomfortable with English translators were used. Translators were hired from among individuals recommended by the community. They had experience, for example, translating for court, band council meetings and for visiting delegations.

The modified interview was then conducted at Hay River Reserve and the results were evaluated. The questions were further modified to the formats used in the remainder of the study. The elders format was a key outcome of the pre-test process.

3.4.3 Application of the Interview

Advice from local contacts suggested that short visits to communities would be worthless, since the appropriate people would probably not be available. Interview candidates had their own lives to live and only extended stays in the community would provide interviewing opportunities. Recognizing the financial expense, extended stays in each community were planned. There were several objectives, besides the point of

necessity, for the extended time: 1) allow the community time to meet and become comfortable with the researcher, 2) allow the researcher time to meet the community, 3) arrange the interviews at the convenience of the respondents, and 4) reach the candidates identified, including those leaving the community early and those arriving later.

Many hours were spent contacting and getting to know some candidates before the formal interview was conducted. Interviews were conducted in homes, cafes or other places of the respondent's choice. In some cases return visits were required to finish the interview.

3.5 The Application of Social Science

How does one determine the individual's attitudes or perceptions, related to forest fire management, of the values-at-risk and of the methods used in community consultation? Surveys, questionnaires, interviews, participant observations and literature reviews are successfully used by social scientists to help expand and develop theory on behavioral and attitudinal issues. An in-person interview structure was employed to deliver the questionnaire used to collect data for this study. Perhaps one of the most important aspects of using questionnaires as the research instrument is that respondents are willing and able to give truthful answers (Berdie, Anderson and Niebuhr 1986). Problems related to interviewing for data collection are: unwillingness to participate in the interview, incorrect interpretation of the questions, and inaccurate answers to the questions. Interviewer bias can also be a problem.

Problems identified and understood in advance may be mitigated. At the outset, endorsement of the study by key individuals can have a major effect on respondents willingness to participate (Berdie et al. 1986). Further, it is important to know the population being surveyed. Local input and pre-testing the questions can provide this type of knowledge. Questions specifically designed for the population being surveyed may then be asked. A well designed set of questions will help respondents answer consistently and accurately. Interviewer variability may also have an impact on responses. Voice inflections, pronunciations, mannerisms, or gestures, all can influence the respondents answers.

These problems were mitigated in this study. First, support from key individuals in the communities helped to legitimize the study. This was a major factor in the participation by community members. Second, questions were designed with input from members of the survey population and were pre-tested before general interviewing. Input from the

communities helped finalize the wording of questions to help ensure their clarity by taking local circumstances into account. Finally, there was one interviewer for all the interviews; interviewer bias was reduced as much as possible.

It is important to comment on these aspects of interview methodology because questions regarding reliability and validity of the responses must be addressed. A researcher can take the above steps to help ensure the questions consistently convey the same meaning to all people in the population surveyed (reliability) and stimulate accurate information (validity).

3.6 Analysis

Much of the information gathered through the interview was qualitative in nature. There were, however several questions that could be statistically analyzed.

One aspect of the analysis needs some explanation. Priorizing all values-at-risk may have been statistically possible if each and every value-at-risk was compared with every other one. This would have meant asking a minimum of 1560 questions at each interview. The study was exploratory in nature and did not have the resources to conduct such a comprehensive interview. The respondents may not have had the patience to undertake such a project. Instead, several key values-at-risk (Appendix 4) were selected to help illustrate the relative ranking process. They were selected in consultation with contacts in the study area. The key values-at-risk were intended to represent resources of very important value to residents of the target population, as well as, to other residents of the north. Another twenty-four values-at-risk were selected, along with the initial seven, to examine relationships among them. The twenty-four were selected to provide a diverse set of values-at-risk for examination. A detailed analysis is presented in the results section.

4.0 RESULTS

This study attempted to: 1) define social and environmental resource values (values-at-risk) endangered by forest fires, and to rank them in relative priority, and 2) describe how to more effectively involve the communities and to recognize their values while implementing forest fire management policy. All objectives sought community members' perspectives. Personal interviews with community members were conducted, and the following section presents the results of those exchanges.

4.1 Number of Respondents

In total, there were 74 individuals interviewed in the four communities visited; 65 were from the target Dene population and 9 were from the Non-target group.

4.1.1 Dene People - Target Population

The 65 individuals represent 1.2 percent of the total target population (5500) or 9.2 percent of the community target population (706). 13 individuals in Hay River, 17 in Fort Liard, 14 in Snowdrift and 21 in Fort Good Hope took part in the interview process. 54 males and 11 females were interviewed. 3 female respondents were from each of Hay River and Fort Liard, 1 female was from Snowdrift and 4 females were from Fort Good Hope. 48 73 percent of the sample) people were between the ages of 30 and 64; 12 (19 percent) people were younger and 5 (8 percent) people were older. The age profile was similar to that of the NWT: 23 percent of the population less than 30 years old, 73 percent between 30 and 64 years of age, and 4 percent 65 and older.

4.1.2 Non-target Group

A small group of individuals (9) were interviewed during the field season that were not from the target population. These 9 individuals represent 12 percent of all interviews completed. Non-target individuals, in the communities visited, make up about 14 percent of the population. There were 3 individuals from Fort Liard and 1 from each of Hay River, Fort Simpson, Fort Smith, Snowdrift, Norman Wells and Fort Good Hope.

4.2 Open-ended Comments

For every question, respondents were encouraged to comment about their answers. Comments formed a significant part of the interview process. Many respondents provided comments. The comments served to detail and reinforce an understanding of the importance of values-at-risk. They cannot be separated from the analysis completely, even though they are subjective in nature. The comments constitute a fundamental component of the study and of the conclusions and recommendations reached. Appendix 3 outlines the comments as recorded at time of interviews.

In general, comments indicated: a) the importance of fighting forest fires, b) the importance of specific places, c) the practicality of letting fires burn, and d) the effectiveness of community consultation.

4.2.1 Fighting Forest Fires

The most frequent comments indicated that all forest land should be protected from fire. It was important to protect forests because Dene traditional life-style and animal life depends on it. Broader concerns such as air and water quality, soil damage, loss of tourism and ozone problems were mentioned to a lesser extent.

4.2.2 Specific Places

The community was mentioned by almost every respondent. Many local areas were specifically named as important to protect. Many of these areas were on lakes or rivers and have been used by the respondents' families for generations. Grave sites, spiritual and historical sites were also referred to as needing protection. Specific locations are cited among the individual comments in Appendix 3.

4.2.3 Letting Fires Burn

Comments recognized that northern forests exist within a forest fire regime and nothing practical can be done to stop the forest from burning. Careful evaluation of each fire needs to be done to define what effectively can be accomplished, especially since resources are limited.

4.2.4 Community Consultation

Comments indicate that personal, informal methods like workshops are favoured over impersonal methods like letters arriving in the mail.

4.3 Results by Interview Question

Results are presented: a) by all-communities combined, b) by individual communities, and c) by non-target group. It is important to note that the sample number becomes very small when individual community or non-target group results are presented. Unless specifically indicated otherwise, the results presented refer to all-communities combined data.

4.4 Forest Fires: Are they Important?

The first question asked respondents: a. should all small fires be fought? and b. should all large fires be fought regardless of dollar costs? The results are summarized in Table 5. Differences in responses among communities are apparent. The non-target group appears to be markedly different from all-communities combined and from individual communities. Only 33 percent (3 of 9 people) and 11 percent (1 of 9 people) answered 'yes' to fighting all small and large fires respectively. This was compared with 97 percent (63 of 65 people) and 88 percent (57 of 65 people) respectively for communities combined. In the non-target group 44 percent (4 of 9 people) and 67 percent (6 of 9 people) suggested, respectively, that all small and all large fires should not be fought.

TABLE 5. Summary of responses to Question 1.

Responses ->		SMALL (%) FIRE			LARGE (%) FIRE		
Community	N	YES	NO	DEPENDS	YES	NO	DEPENDS
Communities	65	97	1.5	1.5	88	3	9
Hay River	13	100			92	8	
Fort Liard	17	100			88	12	
Snowdrift	14	100			100		
Fort Good Hope	21	90	5	5	76	5	19
Non-target	9	33	44	22	11	67	22

4.5 Priorization of Values-at-Risk: an Importance Continuum

Respondents were asked, in the second and fifth questions to rate selected values-at-risk. The scale used was: 1 (most important), 2 (important), 3 (neutral), 4 (not important)

and 5 (least important) to protect from forest fire; the scale was recoded, 5 (most important) to 1 (least important), for computer analysis. On average, respondents rated each value-at-risk greater than 4 (important). The average range was 4.21 to 4.97 out of a maximum of 5 for all-communities combined. Individual communities and non-target group respondents showed different average ranges in their rankings (Table 6). Respondents provided additional replies in a comments section (Appendix 3).

TABLE 6. Summary of average ranges when rating importance over all values-at-risk in Questions 2 and 5.

	N	Average Range of Individual Mean Scores 2 3 4 5
Communities	65	4.21---------4.97
Hay River	13	4.00----------5.00
Fort Liard	17	3.64----------4.91
Snowdrift	14	3.25----------5.00
Fort Good Hope	21	4.20----------5.00
Non-Target	9	2.44----------4.89

Questions 3 and 4 were intended to be descriptive and open-ended in nature. They asked respondents to describe areas that should not be burned (Question 3) and areas that may be burned (Question 4). Few respondents answered either question comprehensively. For Question 3, comments generally emphasized that no forest land should ever be burnt. For Question 4, respondents commented that some prescribed or controlled burning may be possible. Examples given were related to preparing fuel woodlot areas, burning logging slash, or burning out fire lines. Most respondents, however, said absolutely no burning.

4.5.1 Quantitative Analysis

Questions 6 and 7 represent the bulk of the quantitative data collected. Question 6 asked respondents to sort a group of values-at-risk into order of importance if each in the group was threatened by forest fire. In Question 7, selected values-at-risk were compared with each other; respondents picked one or the other as more important.

It is useful to present Question 7 first; it was used to try to derive an initial continuum of ranking of importance for values-at-risk. Seven selected values-at-risk were chosen from 54 identified in the interviews. The seven: town site, petroleum facility, commercial forest, trapline, hunting area, caribou winter range, and park area were compared with each other. Respondents were asked to choose which one of two values-at-risk they would protect first from forest fire. An average mean score for each value-at-risk was calculated from their choices. The average mean score was an average of all mean scores for similar values-at-risk. The mean score was the algebraic sum of all scores for the value-at-risk divided by the number of respondents. The average mean scores were used to depict a continuum of priorized values-at-risk.

Figure 2 shows the ranking of importance for: all-communities combined, Hay River Reserve, Fort Liard, Snowdrift, Fort Good Hope and Non-target group data. The initial ranking by the all-communities data of the seven selected values-at-risk was used to indicate a continuum of importance among values-at-risk. This initial ranking was: town site, trapline, hunting area, petroleum plant, caribou winter range, park area and commercial forest.

Figure 2 also compares priorities accorded to the selected values-at-risk by all-communities combined, by the individual communities and by the non-target group (Appendix 5 for numerical values). The ranking of values-at-risk, although not statistically confirmed, indicated general trends that were important. Townsite was ranked number one in all cases but other differences were apparent. Other differences, for example, included the ranking of caribou winter range and petroleum plant. Snowdrift ranked caribou winter range number one, tied with townsite, but Hay River, Fort Liard and the Non-target group ranked caribou at sixth on the continuum. Petroleum plant was ranked fourth by all-communities combined, but Hay River and Fort Good Hope ranked it higher. Snowdrift ranked it lower (Figure 2).

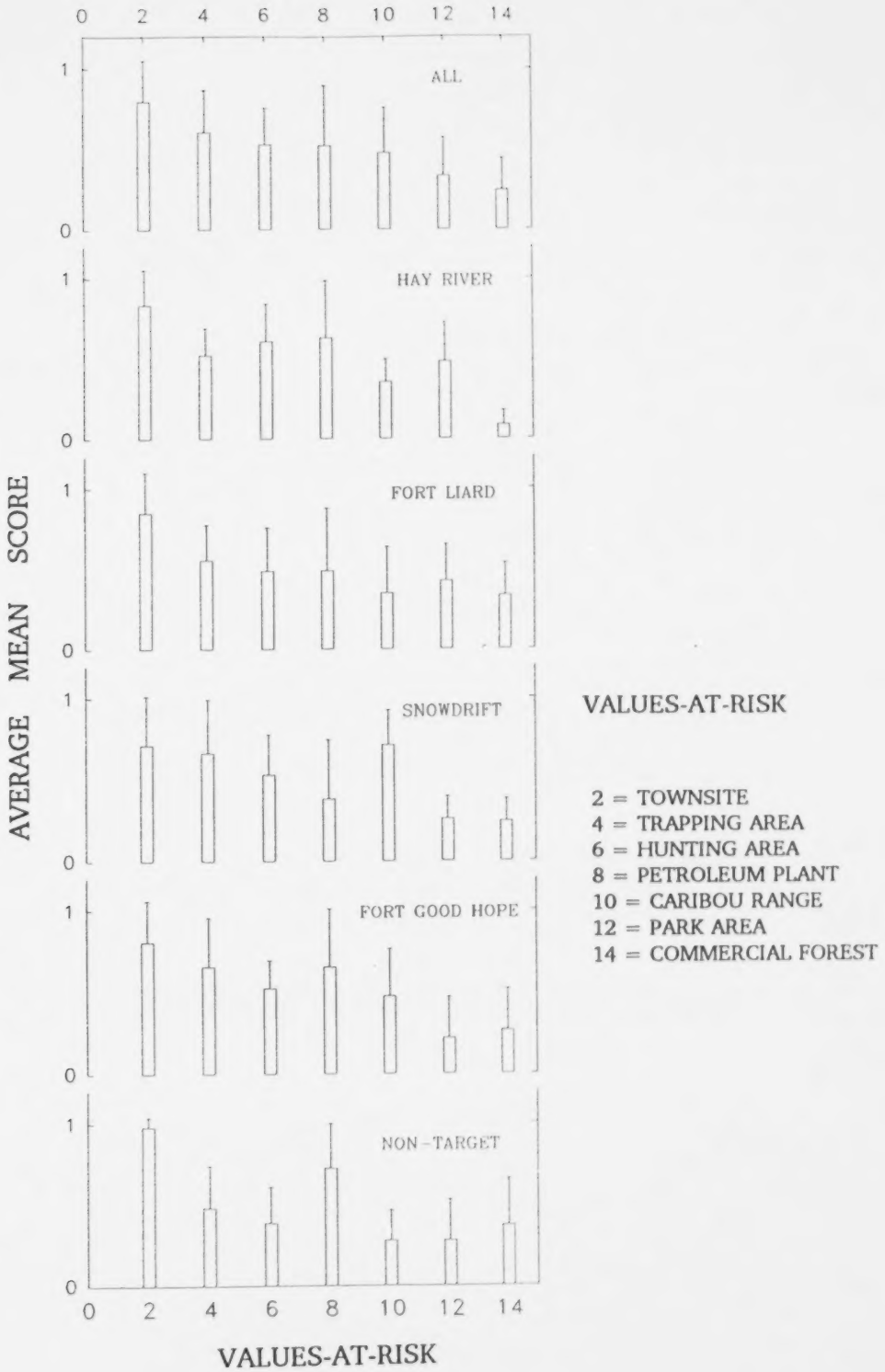


FIGURE 2. Graphical summary indicating average mean scores for values-at-risk in Question 7 (standard deviation bar indicated).

The average mean scores depicted a continuum of importance. The data collected is ordinal in nature and as such no measurable interval between average mean scores of the values-at-risk can be implied. A statistical comparison of means was used to test relative order along the continuum of the values-at-risk. The comparison tested the null hypothesis that the two average mean scores being tested were equal. Table 7 summarizes the outcome of the comparison between average mean scores. Values in the table are the statistical levels of significance at which a difference between two means can be distinguished. In each of Tables 7a to 7f, a dashed line highlights the .10 level of significance. This can be interpreted as: at the .10 level, the null hypothesis (the two means being tested are equal), can be rejected below the dashed line, and the null hypothesis cannot be rejected above the dashed line. For this question, Table 7 may be translated as follows: a) below the dashed line values-at-risk are statistically different and b) above the dashed line they are not distinguishable as being different with the data on hand.

The indication in Table 7a (all-communities), is that townsite (1), park area (6) and commercial forest (7) are in their proper order on the continuum. Trapline, hunting area, petroleum plant, and caribou winter range may be interchangeable along the continuum provided trapline is placed more important than caribou winter range.

The comparisons for individual communities and non-target group data are also reported. The output was less revealing than the data from all-communities. This could be attributed to the small sample in these data sets. Hay River data indicate commercial forest (7) was in the proper order but the other six values-at-risk may be interchangeable with a few ordering rules being followed. For example, townsite precedes trapline, park area and caribou winter range. Hunting area and trapline both precede caribou winter range. Fort Liard and the Non-target group data indicate that townsite (1), was in the proper order but the other values-at-risk may be interchangeable with a few rules. Both Snowdrift and Fort Good Hope data indicate all values-at-risk may be interchangeable.

Question 7 focused on seven principal values-at-risk only (Appendix 4). There were 54 values-at-risk identified during the interview process. Question 6 examined 31 of these in an attempt to order them on the continuum (Appendix 6). In addition to the first seven, 24 other values-at-risk were then ordered on the continuum.

TABLE 7. Summary of significance from compared means in Question 7 (Significant at .10 level below dashed line).

ALL	TOWN	TRAP	HUNT	PTRL	CARB	PARK	FRST
TOWN	--						
TRAP	.007	--					
HUNT	.000	.118	--				
PTRL	.000	.411	1.00	--			
CARB	.000	.007	.329	.622	--		
PARK	.000	.000	.000	.014	.053	--	
FRST	.000	.000	.000	.000	.008	.055	--

a. All Communities Combined

HAY	TOWN	PTRL	HUNT	TRAP	PARK	CARB	FRST
TOWN	--						
PTRL	.106	--					
HUNT	.164	.918	--				
TRAP	.035	.537	.316	--			
PARK	.021	.414	.390	.699	--		
CARB	.004	.142	.003	.068	.265	--	
FRST	.000	.007	.000	.000	.008	.000	--

b. Hay River Reserve

LIARD	TOWN	TRAP	PTRL	HUNT	PARK	CARB	FRST
TOWN	--						
TRAP	.003	--					
PTRL	.030	.937	--				
HUNT	.006	.416	.710	--			
PARK	.001	.343	.331	.363	--		
CARB	.000	.004	.227	.235	.553	--	
FRST	.000	.007	.073	.033	.201	.663	--

c. Fort Liard

TABLE 7. Summary of significance from compared means in Question 7 (continued).

SNOW	TOWN	CARB	TRAP	HUNT	PTRL	PARK	FRST
TOWN	--						
CARB	1.00	--					
TRAP	.794	.653	--				
HUNT	.210	.074	.260	--			
PTRL	.014	.073	.152	.331	--		
PARK	.001	.000	.008	.022	.333	--	
FRST	.003	.000	.001	.013	.321	.756	--

d. Snowdrift

HOPE	TOWN	TRAP	PTRL	HUNT	CARB	FRST	PARK
TOWN	--						
TRAP	.314	--					
PTRL	.303	.931	--				
HUNT	.034	.095	.334	--			
CARB	.061	.084	.361	.591	--		
FRST	.001	.059	.016	.088	.255	--	
PARK	.000	.010	.022	.003	.143	.766	--

e. Fort Good Hope

NON-T	TOWN	PTRL	TRAP	HUNT	FRST	CARB	PARK
TOWN	--						
PTRL	.028	--					
TRAP	.001	.165	--				
HUNT	.000	.046	.384	--			
FRST	.000	.010	.500	.898	--		
CARB	.000	.009	.074	.347	.444	--	
PARK	.000	.011	.129	.332	.594	1.00	--

f. Non-target Residents

4.5.2 An In-depth Look at Question 6

Analysis of Question 6 looked at relationships and comparisons found within the structure of the question. There were two components addressed: 1) was corroboration of the order of the principal values-at-risk possible, and 2) could other values-at-risk be placed on to the continuum of importance?

The question consisted of eleven groups, each with five selected values-at-risk that were priorized by respondents. There were 31 values-at-risk examined in the question including the seven principal values-at-risk from Question 7.

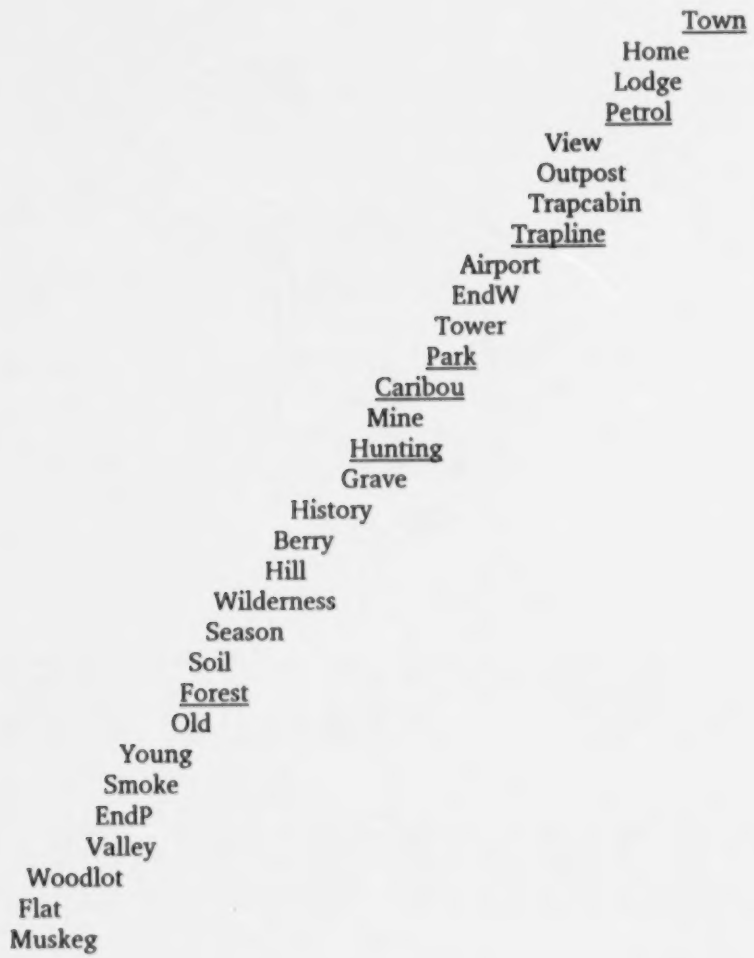
Respondents were presented the values-at-risk, that could be threatened by forest fires, in groups of five. They were asked to indicate the order to which threatened values-at-risk they would send men and equipment if they were responsible to make the choice. The order was recorded as 1 (first) to 5 (last). Hand drawn representations of the values-at-risk were used to help respondents keep track of their choices (Appendix 7). Respondents were able to shuffle and order the drawings until they felt comfortable with their choice.

Mean scores, over all respondents, were calculated for each value-at-risk (Appendix 8). The mean score was the algebraic sum of all scores for the value-at-risk divided by the number of respondents. This produced an initial priorization for the 31 values-at-risk (Table 8). The seven key values-at-risk from Question 7 are underlined in the table. This order could not be considered a statistically defensible ranking because each value-at-risk earned its mean score relative to only the four other values-at-risk with which it was compared. It was inappropriate to do a comparison of means test on all 31 values-at-risk, as they had not all been compared with each other. A modified comparison method was devised to help establish where the values-at-risk might fit on the continuum. The method is described in the sections that follow.

4.5.3 Ranking the Groups of Five Values-at-Risk

There were eleven groups of five values-at-risk each in Question 6. Respondents ranked each value-at-risk relative to the four others in the group. Initially, a mean score was defined for each value-at-risk in the group based on the responses from all participants.

TABLE 8. Indicated ranking for values-at-risk in Question 6.



Key values-at-risk from Question 7 are underlined.

Next, the differences among the mean scores were calculated for each group of five. For example, the first group of values-at-risk consisted of townsite, tower, commercial forest, muskeg, and caribou winter range. The mean scores and differences among them are presented in Table 9.

TABLE 9. Summary of mean scores and differences for first group of five in Question 6.

Value-at-risk	Mean Scores	Differences between mean scores				
		C1 Town	C2 Towr	C3 Carb	C4 Frst	C5 Musk
Townsite	4.74	--				
Tower	3.23	1.51	--			
Caribou	3.09	1.65	.14	--		
Forest	2.53	2.21	.70	.56	--	
Muskeg	1.44	3.30	1.79	1.65	1.09	--

This procedure was executed for each of the eleven groups. The calculated differences were inserted into one large matrix incorporating all 31 values-at-risk (Appendix 9). The matrix has many of the difference calculations missing and can only be considered as partially complete. Time and resources were not available to sample for a complete matrix.

4.5.4 The Concept of 'Order Index'

Each group of five values-at-risk can be shown as an example of a complete matrix of differences. Descending order of scores indicated where each value-at-risk was ranked for importance, and ascending order of calculated differences gave an indication of where each value-at-risk might be positioned on a continuum (differences should increase, both up and down from the matrix diagonal of 0.0). These ascending differences led to the concept of an 'order index'.

Order index refers to the number of differences, associated with each value-at-risk, in a wrong sequence (error). Error was defined as the minimum number of row moves required to establish an ascending order in the column. An order index of 0 indicated perfect order of the values-at-risk; calculated differences increase, both above and below the diagonal. Table 10 and Table 11 show, by example, how order index was derived using the calculated differences among mean scores for values-at-risk.

TABLE 10. Example of an order index with perfect ranking both above and below the diagonal.

Value-at-risk	Differences between mean scores Town	Home	Towr	Carb	Tcab	Frst	Ldge	Sean	Musk	
Townsite	--	.85	1.51	1.65	1.91	2.21	2.33	3.25	3.30	R1
Home	.85	--			1.06		1.48	2.40		R2
Tower	1.51		--	.14		.70			1.79	R3
Caribou	1.65		.14	--		.56			1.65	R4
Trapcabin	1.91	1.06			--		.42	1.34		R5
Forest	2.21		.70	.56		--			1.09	R6
Lodge	2.33	1.48			.42		--	.92		R7
Seasonal	3.25	2.40			1.34		.92	--		R8
Muskeg	3.30		1.79	1.65		1.09			--	R9
Error	0	0	0	0	0	0	0	0	0	

ORDER INDEX = 0

This is an example of a perfect ranking of the values-at-risk.

The order of values-at-risk delineated by the mean scores for Question 6 was used as the starting point in the process towards establishing a continuum for the 31 values-at-risk (Table 9). This ranking has an order index of 60. Consideration was not given to the comparisons among values-at-risk in Question 6 when this continuum was established. The order index can be improved (error reduced) with careful consideration of these comparisons. Changing the matrix row sequence of the values-at-risk, on an iterative basis reduced the amount of error. The order index was reduced to 15 when all comparisons are considered (Appendix 10). Further iterations did not reduce the order index. Table 12 indicates the final ranking of the 31 values-at-risk with the order index of 15. In some cases there was no difference for the ranking of a value-at-risk compared to Table 8; in other cases the values-at-risk have increased or decreased in importance. This is noted on Table 12 by '=' being no change, '+' being an increase or '-' being a decrease.

TABLE 11. Example of establishing order index based on ascending differences among groups in Question 6.

Value-at-risk	Differences between mean scores Town	Home	Towr	Carb	Tcab	Frst	Ldge	Sean	Musk	
Townsite	--	.85	1.51	1.65	1.91	2.21	2.33	3.25	3.30	R1
Home	.85	--			1.06		1.48	2.40		R2
Lodge	2.33	1.48			.42•		--	.92		R3
Tower	1.51		--	.14		.70			1.79	R4
Caribou	1.65		.14	--		.56			1.65	R5
Trapcabin	1.91	1.06			--		.42•	1.34		R6
Seasonal	3.25	2.40			1.34		.92	--		R7
Muskeg	3.30		1.79	1.65		109•			--	R8
Forest	2.21		.70	.56		--			109•	R9
Error	2	1	1	1	1	1	1	1	1	
					ORDER INDEX = 10					
	C1	C2	C3	C4	C5	C6	C7	C8	C9	

C1 is column one and R1 is row one of the matrix.

• Trapcabin/Forest actually had a greater score than Lodge/Muskeg but in this example they are placed after Lodge/Muskeg in the rank. Consequently an error was assigned to these columns.

4.5.5 Corroboration of the Order of the Principal Values-at-Risk

An order index of 28 is obtained if the seven principal values-at-risk are inserted, as portrayed by all-communities data (Figure 2), into the 31 values-at-risk continuum. The increase in order index, or error, suggested the initial importance continuum cannot be corroborated by the data gathered in this study. Townsite was ranked first as the more important value-at-risk in both cases, but the others are found in a different order than in the all-communities data continuum.

4.5.6 Placement of Other Values-at-Risk on to the Continuum

There were 24 values-at-risk, besides the seven principal ones, inserted into a continuum of importance. Due to the nature of the partial completeness of comparisons among values-at-risk this continuum, like the one from Question 7, cannot be judged as a definitive picture of respondents values. The comparative nature of the question, however, does lend credence to the continuum established by Question 6.

TABLE 12. Indicated ranking for values-at-risk in Question 6 considering inherent order in responses.

= Town
= Home
+ Petrol
+ Trapcabin
+ Airport
+ Tower
+ Caribou
= Trapline
+ EndW
+ Hunting
+ History
- Outpost
- Lodge
+ Grave
+ Valley
+ Forest
+ Season
+ Woodlot
- View
= Wilderness
- Park
+ EndP
- Mine
- Berry
- Hill
- Soil
- Old
- Young
- Smoke
= Flat
= Muskeg

LESS IMPORTANT ---------- MORE IMPORTANT

ORDER INDEX = 15

'=' No change from Table 8
'+' Increased importance
'-' Decreased importance

Key values-at-risk from Question 7 are underlined.

4.6 Consultation

The second objective of the study was to better understand the importance of community consultation. Questions 8 through 14 of the interview helped examine aspects of community involvement in the NWT.

4.6.1 The Importance of Community Involvement Methods

There were 13 commonly used methods or practices for community consultation identified in the interview (Appendix 11). Question 8 asked respondents to rate the various methods on how important these methods were in keeping community members involved or informed with aspects of forest fire management. Each method was rated on a scale from 1 (most important) to 5 (least important); the scale was recoded, 5 (most important) to 1 (least important), for computer analysis. Community members rated the various methods as described in Table 13.

TABLE 13. Summary of calculated means for methods or practices of community consultation (all-communities data).

METHOD OR PRACTICE	MEAN	STD DEV	n
Workshop	4.35	.88	23
Meeting (Forest)	4.33	1.05	24
Meeting (Community)	4.30	.67	27
Television	4.14	.97	28
Word of Mouth	4.13	.80	24
Community Developed	4.04	1.02	23
Radio	3.93	.94	30
Poster	3.91	.79	23
Open House	3.89	1.09	27
Newspaper	3.67	1.11	21
Magazine	3.59	1.05	22
Pamphlet (Dene)	3.57	1.16	23
Letter to Resident	2.90	1.12	20

A comparison of means test conducted on the all-communities data indicates some significant differences between selected methods of community consultation. Table 14 summarizes the indicated significance between methods.

TABLE 14. Summary of significance from compared means in Question 8 (multiply all values by 0.001 except for values of 1.0).

Workshop												
Meeting (Forest)	592											
Meet (Community)	1.0	479										
Television	427	283	405									
Word of Mouth	549	407	377	802								
Community	596	465	329	1.0	1.0							
Radio	056*	076*	067*	227	410	300						
Poster	151'	107'	049*	504	419	428	525					
Open House	197'	148'	259	582	650	789	802	651				
Newspaper	045*	083*	019*	148'	248	066*	214	298	428			
Magazine	021*	076*	008*	204	288	083*	096*	187'	426	163'		
Pamphlet	136'	028*	015*	036*	023*	096*	418	233	124'	772	449	
Letter	001*	000*	000*	001*	002*	000*	003*	001*	002*	006*	003*	145'

* Significant at .10 level ' Significant at .20 level

All methods of community consultation rated higher than Letter to Resident. Significant differences, at the .10 level, occurred between some of the techniques at the top of the table and some of the techniques at the bottom of the table. For example, workshop was more important than radio, newspaper, magazine and letter; meeting (forest) was more important than radio, newspaper, magazine, pamphlet and letter; and meeting (community) was more important than radio, poster, newspaper, magazine, pamphlet and letter. It was not clear from the means test how the techniques at the top of the table are rated. For example, workshop, meeting (forest), meeting (community), television, word of mouth, community and open house, statistically, are no different. In general, newspaper, magazine, pamphlet and letter were rated lowest.

Responses from individual communities and the non-target group appeared to indicate different rankings than the all-community combined data. Sample size was small amongst these groups and only the broadest interpretation could be considered. Table 15 summarizes the ranking of each method for all-communities, individual communities and non-target

TABLE 15. Summary of the ranking order for methods of community involvement by all-communities, individual communities and non-target group data (Question 8).

ALL	HAY	LIARD	SNOW	HOPE	NON-TARG
WORKSHOP	WORKSHOP	MeetFRST	MeetFRST	COMMUNTY	MeetCMMT
Meet FOREST	MeetCMMT	OPNHOUSE	COMMUNTY	MeetCMMT	COMMUNTY
Meet COMMNT	TV	TV	MeetCMMT	MeetFRST	MeetFRST
TV	POSTER	WORKSHOP	WORKSHOP	TV	MOUTH
MOUTH	COMMUNTY	MOUTH	MOUTH	MOUTH	OPNHOUSE
COMMUNITY	MOUTH	MeetCMMT	PAMPHLET	RADIO	PAMPHLET
RADIO	OPNHOUSE	POSTER	RADIO	WORKSHOP	WORKSHOP
POSTER	MAGAZINE	RADIO	POSTER	LETTER	TV
OPEN HOUSE	NEWSPAPR	COMMUNTY	OPNHOUSE	PAMPHLET	LETTER
NEWSPAPER	RADIO	NEWSPAPR	TV	POSTER	RADIO
MAGAZINE	MeetFRST	MAGAZINE	MAGAZINE	NEWSPAPR	POSTER
PAMPHLET	LETTER	PAMPHLET	NEWSPAPR	MAGAZINE	NEWSPAPR
LETTER	PAMPHLET	LETTER	LETTER	OPNHOUSE	MAGAZINE

group data. No mean tests were reported for individual communities or the non-target group. Note is made here that very little statistical significance was found in these data sets for community consultation methods or practices. However, the comments offered by the respondents indicated that personal, informal methods like workshops or small meetings were favoured over impersonal methods like letters, newspapers or magazines.

4.6.2 Community Involvement May be Improved

Questions nine through fourteen asked respondents for their thoughts and comments on aspects of community consultation regarding forest fire management. The aspects included were: the best (9) and alternative way (10) to contact individual; the lead-time needed to prepare for involvement (11); the signs used to indicate consultation was working (12); the ways the consultation process could be improved (13); and the specific role the individual would like to play (14). Responses were qualitative in nature and general thoughts, actions, or trends were provided.

In general, the best way to contact respondents was to do it in person. Most alternatives were acceptable, especially if contact was of a personal nature and specifically requesting the individual to be involved. Although some respondents indicated they were available immediately, many respondents indicated they would need some time to prepare themselves for any involvement in forest fire management or planning. Time requirements suggested ranged from several days to several months.

The success of consultation was measured in as many ways as there were respondents. Consultation was seen to be successful when community ideas were used; when people talked about forestry in the community; when things got done not just talked about; and when working together rather than squabbling with government.

For the most part, respondents thought the consultation process was "pretty good". Some could not think of any way to improve upon the process but others were able to suggest ways to improve the consultation process between community and forestry. The majority of comments fell into three main categories: continued involvement, enhanced involvement, and community empowerment.

Continued involvement generally suggested delivering advance information and more community contact programs such as community meetings, television, and posters. Advance information included things like debriefing on fire activities during the fire, as well as after, information intensive fire management posters or television specials. Comments under the enhanced involvement category favoured concentrating on education through workshops with fire management themes, developing inventories of forest systems, and providing programs in Slavey by enlisting translators or staff who spoke Slavey. The final category was community empowerment. Comments generally indicated that monies for fire management should be allocated to regions to administer in their own best interests.

Respondents generally were interested in being involved with the forest fire management program. Comments indicate three levels of involvement: management planning, community liaison, and newcomer participant. Those interested in management planning were concerned with community welfare and stability, environmental protection and community responsibilities. Those at the community liaison level indicated they were eager for the community to learn more about forest fire management. The newcomer participant group did not necessarily know much about forest fire management, but they were keen to be involved in some aspect of the process.

5.0 DISCUSSION

The data, both quantitative and qualitative, presented as results in the previous section, help outline the desire by communities in the Northwest Territories to play a leading role in resource management. This section will discuss the implications of the results for forest fire management. Four main elements will be discussed: 1) representativeness, 2) importance of fighting forest fires, 3) priorization of values-at-risk, and 4) importance of community consultation.

5.1 Representativeness

The ability to generalize from the results is an important contribution for any research. Results that are representative may be used by managers or decision-makers in other jurisdictions that otherwise would not have the resources for specific studies. The high percentage of respondents suggesting forest fires must be fought may indicate this thought was representative for the small communities in the forested areas of the NWT. Managers can expect community support for forest fire fighting programs. More important, perhaps, is that managers can expect resistance to 'let burn' or prescribed fire policies unless communities are given explanations and are involved in discussions and decision-making.

5.2 The Importance of Fighting Forest Fires

Forest fire can have a substantial impact on small communities in the NWT, and it was expected that residents would have strong feeling about fighting fires. A fundamental objective of this study was to determine if the residents thought it important to fight forest fires. The first question of the interview asked if it was important to fight all forest fires. The answer to the question was expected to be yes, and in general, regardless of the cause or size of a forest fire the residents interviewed indicated that all forest fires should be fought. There are a few notable exceptions. In this information was the basis for describing the importance of ranking values-at-risk.

Respondents' comments regarding why fighting forest fires was important were varied. All were important to hear and to try to understand. The comments may be summarized under four general categories: 1) importance to the individual, 2) importance to the community, 3) importance to the ecosystem, and 4) importance to future generations.

Individual attitudes reflected in the comments tended to relate to the person's ability to continue to utilize the forest resource without complications. Comments reflecting this were: fires should be fought to protect my trapline, my hunting areas, my family's traditional use areas, my memories or spiritual places.

Respondents reflected community attitudes in comments such as: our community depends or has always utilized the forest area as part of our way-of-life; our health depends on the forest; we obtain spiritual enrichment from the forest.

The ecosystem, both local and global were promoted in comments reflecting importance of wildlife habitat protection, wildlife seasonal patterns, water quality, and air quality.

Future generations of residents were considered where individuals' comments indicated the need to protect future forest values including habitat, forestry and recreational potential.

The four categories perhaps reflect and may help summarize values that individuals have for their community, the forest around them, and the future, both for the environment/forest and for their children.

A complex impression of values for forest land use began to emerge after listening to and empathizing with respondents. There are almost as many value interpretations of the forest resource as there are individuals. However, most people do want forest fires fought (Table 5). The non-target group generally indicated that fires should not be fought (Table 5). They considered fire as an integral part of the northern forest ecosystem, and scarce resources expended on fires, large fires in particular, could be better utilized in other programs. Their comments fall primarily into the ecosystem and future generations categories.

The four communities visited were similar; there were, however, some differences. For example, all were Dene communities but all were located in different geographical regions. The communities have had different cultural/linguistic development: Snowdrift was Chipewyan, Hay River Reserve and Fort Laird were Slavey, and Fort Good Hope was Hareskin (Outcrop 1991, Dene 1984). Respondents from the individual communities, although having similar thoughts about small fires, had different thoughts about fighting large fires. For example, consider responses from residents of Snowdrift and Fort Liard. In Snowdrift, barren-ground caribou play a very important role in the life-style of residents and

the community's existence; in Fort Liard there are very few caribou and in their place, moose play an important role. Fire destroys the lichen forage, a primary winter diet of caribou; fire usually enhances deciduous browse, a primary winter diet for moose. This may help to explain why all respondents in Snowdrift indicated that all fires should be put out and while some respondents in Fort Liard suggested not all large fires need be fought. Community oriented or traditional values may act on individuals to provide a strong community focus, like Snowdrift, where the entire community relies heavily upon the caribou.

Although migrating caribou play an important role in the existence of several communities it is possible that the individual's attitudes towards forest fire may be influenced by other factors. Snowdrift and Fort Good Hope have traditionally utilized migrating caribou for required nutrition. Attitudes or community focus in Fort Good Hope may be influenced more by the geographic location of the community.

Snowdrift is on the east arm of Great Slave Lake. Each Snowdrift respondent indicated all large fires should be fought. The community is in the midst of the winter migration route for caribou. Caribou can be successfully hunted from town. Residents would have to travel longer distances to successfully hunt the caribou if large fires were not fought. Large forest fires tend to deflect or re-route migrating herds to other areas (Thomas 1990). In traditional nomadic settings, following the caribou would not have been an issue, but modern Snowdrift is a well established community and residents would not be so mobile today.

Fort Good Hope is on the eastern shore of the Mackenzie River just below the Arctic Circle. One quarter of the Fort Good Hope respondents indicated that large fires should not be fought or they should only be fought under certain conditions. Migrating caribou pass by the area at some distance. Community members travel, usually over several days, to hunt the caribou. The community of Colville Lake, at one time, was an outpost camp used for extended hunting and trapping expeditions by people of the Fort Good Hope area. Colville Lake has now grown into a small community.

Since Fort Good Hope is so far north the fire season can be intense but it is usually short. In the past, fires were not necessarily always fought. Seasonal influences and lower fire incidence may contribute to the "no, do not fight" or "depends, look at situation before fight", responses.

5.2.1 Management Implications of Fighting Forest Fire

The broad spectrum of values may have serious implications for forest fire management. Managers will have to include both individuals and communities in forest fire management planning processes. Individuals in the community hold a wealth of knowledge about local history and current conditions. Residents will have to be actively solicited for their input. An environment of cooperation between managers and residents needs to be fostered for a successful process.

Communities can be as distinct in their value identification as the residents living in them. Individuals may see a specific area as being important to them and their family. The community may see those areas as part of a greater region that is important for long term community stability. Group trapping areas and land claim areas are possible examples of community concern.

5.3 The Priorization of Values-at-Risk

Human life, listed first in the forest fire management policy hierarchy of values-at-risk (GNWT 1990), was almost unanimously rated as very important to protect. This was expected. The protection of human life was considered a constant throughout the study, and the interview process concentrated on other values-at-risk. Over 50 values-at-risk were incorporated into the interview, and all values-at-risk were considered important. It was expected that some values-at-risk would be more or less important than others. In several questions, respondents rated importance solely on the single value-at-risk identified. For example, commercial forest was rated without comparing it with other values-at-risk. Table 6 summaries the range of ratings for responses to Questions 2 and 5. These ranges tend to confirm that all values-at-risk identified in the interview were important. This does not help establish if any values-at-risk are more or less important than other values-at-risk.

Respondents showed their willingness to rank values-at-risk. For example, respondents rated trapline areas as very important and then rated muskeg areas as very unimportant. This indicated that some values-at-risk were of greater or lesser importance in the mind of the respondent. Questions 6 and 7 incorporated comparisons of multiple values-at-risk. Respondents, for the most part willingly made the comparisons, and they struggled with choices between two values-at-risk they felt to be equal. As an example, choosing between trapline area and petroleum facility was difficult for some respondents.

Question 7 enabled development of an importance continuum. The order of the seven selected values-at-risk was statistically significant for townsite (1), park area (6) and commercial forest (7). Townsite was more important and park and forest are less important. The others, trapline, hunting area, petroleum facility and caribou winter range were of equal importance, statistically. The lack of significance helped indicate the diversity of values held among individuals interviewed. The difficulty encountered in choosing between two important values-at-risk was also indicated.

Townsite, ranked as first to be protected from fire, may represent the cumulative consciousness of the community. Certainly, a great deal of material wealth was held here. This may be an interesting area for further study: The socio-economic implications of nodal settlement by traditional peoples.

Question 6 provided the additional information needed to represent a total of 31 values-at-risk on the importance continuum. Analysis of the data was not able to describe a definitive order of importance, but it reinforced the idea of values-at-risk being a very complicated ingredient in forest fire management.

5.3.1 Management Implications of Priorizing Values-at-Risk

Managers may be able to initiate forest fire management planning based on common values-at-risk. Forest fire management initiatives are likely to be successful if the communities are consulted to help ensure a comprehensive forest fire management plan.

Many values-at-risk identified are common, in some degree, to all communities in the study area. There will be, however, values-at-risk that are unique to each community. As an example, all communities generally favour protection of local hunting and trapping areas but only one of the communities visited has a gas production facility and they consider it very important to protect.

A consultation process may foster an expectation that all values-at-risk identified will be protected from forest fire, no matter what. Managers need to solicit input and to ensure contributors are fully aware of the planning objectives. The forest fire management policy (GNWT 1990) hierarchy of values-at-risk will be especially important in multiple fire conditions, where many different values are threatened and resources may become scarce. The results indicate that the implementation of the policy should be different in each region. Flexibility in the policy and by managers must be recognized to help ensure forest use objectives are met.

5.4 The Importance of Community Consultation

5.4.1 Overview

The consultation section of the interview, in general, caused the most difficulty for respondents. Questions asked respondents about forest fire management, and answers indicated respondents felt forest fire operations were adequate. This, however, was not what was expected. Respondents with experience in local or regional committees tended to answer consistent with the question. Questions that were answered inconsistently provided good descriptive information for the study. They help reinforce the importance of the management implications and identified issues in this section. The primary question regarding community involvement methods was not influenced by inconsistency in other questions.

A few respondents, as evidenced by their comments, did not understand the term forest fire management. The term consultation was also confusing. Suggestions indicated that the word 'consultation' may have negative connotations. For example, 'consultation', for some people may have been synonymous with, "we'll look after you" or "we know best" attitudes. The phrases 'to tell' or 'to ask' were used during the interview, in the place of consultation. This adjustment was made after pre-testing. There were no indications to make one believe that the responses were affected by bias against 'consultation' as such.
General comments indicated that individuals were sceptical about government's efforts in areas of community development or land claim settlements.

The implications for management are significant. First, if consultation is not taken seriously by management, the community may decline to contribute and, possibly, the community may opt for political solutions to ensure they are considered. Solutions of this nature may not be in the best interest of management, the community or the forest. All parties involved must be forthright and participate fully if there is to be an effective communication and consultation process.

Second, managers may be handicapped because meanings for contemporary concepts like 'management' and 'consultation' may not be easily expressed in traditional languages. The Dene language is a small word language (Sonfrere 1991).

Finally, other issues identified through the respondents comments need to be addressed. These issues are: they do not understand consultation, they are not normally

involved, it is not the individual's place to be involved, there is general mistrust of all government, people are afraid to participate because they do not understand or cannot speak English well enough to participate.

5.4.2 Community Involvement Methods

The thirteen methods examined in the results section may be grouped into three main categories: personal and small, personal and large, and impersonal. As an example, workshops would be personal and small, open houses would be personal and large, and letters or pamphlets would be impersonal. Generally, personal and small methods were considered better than personal and large, which were considered better than impersonal. Small informal groups (workshops) are able to devote the time to help everyone understand the objectives. In large groups, time often is not allocated to ensure everyone understands. Some people may decline to participate because the large group, for them, cannot be an effective method of community consultation.

All methods of community involvement available may be employed to help with forest fire management planning. Each project will have its own requirements for community involvement. Effective involvement means listening to and understanding each others needs as the planning process evolves. Those involved need to be flexible and incorporate all methods that lead to the success of the program.

5.4.3 Management Implications of Strengthening Community Involvement

The implications for management are mostly favourable if community consultation is successful. Personal contact between managers and community members, is critical to developing a close working relationship. Processes that identify and utilize methods preferred by the community may help facilitate planning and management activities. Values identified by consultive processes must be made an integral component of the forest fire management policy.

Continued expenditure of time and financial resources is required for community consultation programs. Management staff and community members require help to recognize and understand the use of involvement methods. Workshops that examine the application of involvement methods may be of benefit to all participants. Management may have to be creative to find the resources to undertake such training. Resources may have

to be augmented as staff and communities recognize the value and successes of participation.

6.0 CONCLUSIONS

Conclusions are specifically related to the target population in the study area.

6.1 Social Science

Application of social science research methodologies can help people understand and then enlist their participation in programs. Socially oriented science is able to incorporate traditional knowledge, and it is harmonious with traditional life-styles and native government processes.

6.2 Values-at-Risk

The most important value-at-risk is the community itself. Detailed descriptions of values-at-risk help define community land use patterns and give some indication of regionally important values-at-risk.

The specific rank order of priorities varied among communities. A definitive ranking of all values-at-risk examined in this study, based on the questions asked and the amount of data collected, was not possible. Major values-at-risk may, however, be ranked for a region.

6.3 Community Involvement

This method of seeking community input suggests a workable means for developing a decision framework for community forest fire management planning. Residents were earnest participants and consultation or involvement techniques that are of a personal and familiar nature should be more effective in community fire management planning than impersonal and formal techniques.

7.0 RECOMMENDATIONS

The importance of community involvement was apparent throughout this research project. Recommendations are offered in four general areas: 1) community consultation, 2) future policy development, 3) other jurisdictions, and 4) future research.

7.1 Community Consultation

Community consultation should continue to be a priority. The enhancement of this program area may take the form of staff and resident workshops that help describe in detail an understanding of the forest resource and its use by all participants. Workshops should provide training in areas such as public involvement, fire management principles and policy development, as well as community governance, traditional knowledge and cultural bias. Community liaison committees, with dedicated members, may be of help once community members and staff acquire a basic understanding of forest fire management issues.

7.2 Future Policy

Future policy should evolve through open community consultation. The 1990 policy sets a hierarchy to values-at-risk beginning with life, then property, followed by resources and then cultural values. Policy implementers should recognize that, regionally, in some cases cultural values are more important than property, and that relative values may change over time.

7.3 Other Jurisdictions

Protection of values-at-risk has been forced upon managers in some jurisdictions, due in part to extensive population growth and to increased awareness and use of forest, wildlife and water resources. All values are expected to be vigorously protected from forest fires. In other jurisdictions with relatively large and unencumbered forest lands the priorization of values-at-risk by communities should help define forest fire management policy. Jurisdictions with forest types, demographics and socio-economic conditions similar to those in the Northwest Territories would most likely benefit from consultative priorization of values-at-risk.

7.4 Future Research

This study did not include the Metis or non-native residents of the forested area of the NWT. Consultation, regarding forest fire management policy, should include them in the future.

More important than including more people is the need for research to examine the socio-economic implications of forest fire management in the Northwest Territories. Co-management of programs with communities should be an important component of future research.

Continued financial and in-kind support for researchers is highly recommended.

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APPENDIX 1

Descriptions of values-at-risk identified in this research study. A short description of each value-at-risk and abbreviations used follows (Alphabetical list).

active mine site (mine)

Mining infrastructure or operation that may be threatened by fire. Primarily the buildings and equipment that would be lost. It was assumed the people could be evacuated.

airport (air)

Airport structures and electronics, as well as the ability to evacuate people.

ancestral grave site (grve)

Marked or unmarked grave sites of family members, others.

archaeological significance

Areas that are generally known to be of significance for their ancient cultures/residents or artifacts from the long past.

berry picking area (brry)

Productive local berry picking areas used extensively by the community.

boat

buffalo sanctuary

Identified by respondents as an important value-at-risk, especially in the Fort Providence area.

caribou winter range (carb)

A very large area of the forest land used as winter range is threatened. The caribou tend to move to other areas when fire occurs (Thomas 1990)

commercial forest or potential for future (forest, frst)

A very large area of sizable trees that are being used or one day may be used as part of a timber harvesting operation.

commercial hunting/fishing lodge (lodge, ldge)

These businesses are found on lakes and rivers and cater primarily to non-residents.

communication tower / radio repeater site (towr)

High-tech communication system components that are often built in isolated forested areas.

corral/fencing

dock/wharf

entire tract of a local woodlot (wood)

A very large area, the entire woodlot, that is extensively used by the community for fuelwood (heating and cooking).

fishing camp

flat lands or uplands (flat)

A very large area of the generally flat land that forms a plateau above the river valley and tends to be continuous forest but somewhat broken by water bodies, small and large.

heavy equipment

highway closure

Identified by the communities suggesting dangerous to drive and an impact on tourism.

hill country or mountains (hill)

A very large area up in the mountains.

historical location (hist)

Locations that have significance because communities were once located there, Hudson's Bay Company type forts or posts.

homesite

Separated from the community as a whole.

local hunting area (hunt)

A very large area used extensively by community members for subsistence lifestyles or for augmenting diet.

major bridge

major road, both sides burn

major road, one side burns

major road construction project

major travel route (walking), both sides

Many areas have traditional/local trails for travel to outposts, smaller communities, hunting/fishing areas, etc.

major travel route (walking), one side

Many areas have traditional/local trails for travel to outposts, smaller communities, hunting/fishing areas, etc.

muskeg/peatlands (musk)

A very large area of muskeg or wet low lying area.

oil refinery

older forest fire area (greater than 50 years old) (old)

Areas that had been burnt more than fifty (lifetime) years ago and would be burned again.

outpost camp (outpost, outp)

More or less permanent camps where people come seasonally to hunt, fish, trap, other.

park area

Established park areas: community, territorial, provincial, national, other.

petroleum/oil/gas production facility or infrastructure (ptrl, petrl)

Constructed in some areas these facilities often represent substantial resources, both benefit and costs.

pipeline structure

proposed land-claim area

Very large areas that are within the proposed land-claim negotiations.

proposed mine site

Area, not yet in production as mine but may be developed soon.

recent forest fire area (less than 50 years old) (yung)

Areas that had been burnt relatively recently (within memory life time) and would be burned again.

river or stream or lowlands (vall)

Very large areas along river or stream valley.

seasonal campsite with tent frames etc. (sean)

Campsite that might have wooden tent frames established, and is not necessarily used yearly.

settlement land area

Very large portion of land that has been negotiated and is under regional/local control.

skidoo vehicle

smoke, heavy smoke in the air for many weeks (smke)

Smoke in the air for many days caused by a large forest fire. What are the conflicts in the community? Health problems and loss of the ability to fish were identified.

soil, fire causes severe damage (soil)

Forest fire will cause severe damage to soil base and vegetation communities will take a long time to recover.

special land reserve for endangered wildlife (endw)

Very large area of land put aside specifically to protect wildlife species.

special land reserve for unique vegetation (endp)

Very large area of land put aside specifically to protect plant species.

spiritual place (sprt)

Areas or sites, locally or generally known as special and may have restorative properties to those that use them.

townsite (town)

The whole community. It is expected that people could be evacuated.

trapline area (trapline, trap)

A very large part of a trapping area. Area or areas used by community members to trap and provide a way-of-life for family.

trapline cabin (trapcabin, tcab)

On the trapline are established trap cabins that are used by trappers to live in during the season and perhaps store their equipment and supplies during the off season.

view, exceptional or unique landscape (view)

Area that is valued for its exception visual aesthetics and would be totally destroyed by forest fire.

wild grass/ prairie area for livestock

wilderness (wnes)

A very large area of land that is not normally used by anybody. It is habited by animals but humans are only infrequent visitors.

wildlife habitat

Areas that are recognized as a good shelter and food source for animals.

APPENDIX 2

Copies of Questionnaire(s) used during interviews.

This is a copy of the long format. The short format used Questions 1, 3, 6, 7, and 8 from this questionnaire. The elder format is also included.

1. ALL small forest fires be fought?
SHOULD?
ALL large forest fires be fought regardless of dollar costs?

YES, NO, DEPENDS

Comments:
small _____
_____
large _____
_____

2. Do you have an area or special place that you would want your great-great grand children to see or experience as it exists today? Where is it and why is it important for children to see it?
_____
_____
_____

How do you feel about these: (Indicate 1=most important, 2=important, 3=neutral, 4=not important and 5=least important)

Wildlife habitat	1 2 3 4 5 X
Caribou habitat/rangeland	1 2 3 4 5 X
Endangered wildlife habitat	1 2 3 4 5 X
Endangered plants	1 2 3 4 5 X
Wild grass/ prairie area for livestock	1 2 3 4 5 X
Trapline area	1 2 3 4 5 X
Berry picking area	1 2 3 4 5 X
Local hunting area	1 2 3 4 5 X
Commercial forest area	1 2 3 4 5 X
Local woodlot or fuel woodlot area	1 2 3 4 5 X
Muskeg/peatland area	1 2 3 4 5 X
Lake/river/stream valley	1 2 3 4 5 X
Unique/exceptional landscape view	1 2 3 4 5 X
Spiritual significance	1 2 3 4 5 X
Historical significance	1 2 3 4 5 X
Archaeological significance	1 2 3 4 5 X
Other: _____	1 2 3 4 5 X

3. Describe some of the areas that you do not wish to see burned.
Can you explain why? or for what reasons?

Now _____
_____
Never _____
_____
_____

4. Describe some of the areas that may be burned at sometime (Can you say when?). What type of fire: size, hot, shape, season?

Now _____
_____
Future _____
_____
_____

5. How important would it be to fight the following types of fires?
(Indicate 1=most important, 2,3,4 and 5=least important)

A fire threatening to burn:

1. a town site	___
2. a home site	___
3. a trapline cabin	___
4. a commercial hunting/fishing lodge	___

5. a seasonal campsite (tent frames etc.) ___
6. a communication tower / radio repeater site ___
7. an airport ___
8. an outpost camp ___
9. an active mine site ___
10. a proposed mine site ___
11. a petroleum/oil/gas production facility ___
12. a major road construction project ___
13. a very large area of commercial forest ___
14. the entire area of a local woodlot or fuel woodlot ___
15. a very large area of hill country (mountains) ___
16. a very large area of flat lands (uplands) ___
17. a very large area along the river or stream (lowlands) ___
18. a very large area of muskeg/peatland ___
19. a very large area of caribou winter range ___
20. a very large portion of trapline area ___
21. a very large portion of berry picking area ___
22. a very large section of local hunting area ___
23. a recent forest fire area (less than 50 years old) ___
24. an older forest fire area (greater than 50 years old) ___
25. a very large portion of a park ___
26. a very large area of a special land reserve (vegetation) ___
27. a very large area of a special land reserve (wildlife) ___
28. a very large tract of wilderness ___
29. an exceptional or unique landscape view ___
30. an area and cause severe damage to the soil ___
31. which will leave heavy smoke in the air for several days ___
32. a spiritual place ___
33. an ancestral gravesite ___
34. a historical location ___
35. a very large portion of settlement land area ___
36. a very large section of proposed land-claim area ___
37. a very large area on both sides of major road ___
38. a very large area on one side of major road ___
39. a very large area on both sides of major travel route (walking) ___
40. a very large area on one side of major travel route (walking) ___

Other: Buffalo sanctuary ___
Highway closure ___

6. You are responsible to send men and equipment to forest fires in this area. Several forest fires are reported at the same time. Which one would you send men and equipment to first, second, third, fourth and fifth?
(Indicate 1=most important, 2,3,4 and 5=least important)

Fires that threaten:

1. a town site ___
6. a communication tower / radio repeater site ___
13. a very large area of commercial forest ___
18. a very large area of muskeg/peatland ___
19. a very large area of caribou winter range ___

2. a home site ___
8. an outpost camp ___
14. the entire area of a local woodlot or fuel woodlot ___
17. a very large area along the river or stream (lowlands) ___
33. an ancestral gravesite ___

3. a trapline cabin ___
7. an airport ___
22. a very large section of local hunting area ___
26. a very large area of a special land reserve (unique vegetation) ___
34. a historical location ___

4. a commercial hunting/fishing lodge ___
9. an active mine site ___
15. a very large area of hill country (mountains) ___
21. a very large portion of berry picking area ___
23. a recent forest fire area (less than 50 years old) ___

5. a seasonal campsite (tent frames etc.) ___
11. a petroleum/oil/gas production facility ___
16. a very large area of flat lands (uplands) ___
20. a very large portion of trapline area ___
27. a very large area of a special land reserve (endangered wildlife) ___

1. a town site ___
2. a home site ___
3. a trapline cabin ___
4. a commercial hunting/fishing lodge ___
5. a seasonal campsite (tent frames etc.) ___

6. a communication tower / radio repeater site ___
7. an airport ___
8. an outpost camp ___
9. an active mine site ___
11. a petroleum/oil/gas production facility ___

13. a very large area of commercial forest
15. a very large area of hill country (mountains)
16. a very large area of flat lands (uplands)
17. a very large area along the river or stream (lowlands)
18. a very large area of muskeg/peatland

19. a very large area of caribou winter range
20. a very large portion of trapline area
21. a very large portion of berry picking area
22. a very large section of local hunting area
28. a very large tract of wilderness

23. a recent forest fire area (less than 50 years old)
24. an older forest fire area (greater than 50 years old)
25. a very large portion of a park
26. a very large area of a special land reserve (unique vegetation)
27. a very large area of a special land reserve (endangered wildlife)

24. an older forest fire area (greater than 50 years old)
28. a very large tract of wilderness
29. an exceptional or unique landscape view
30. an area and cause severe damage to the soil
31. which will leave heavy smoke in the air for several days

Comments _____

7. Two forest fires are reported to you. You have a few men and limited equipment. Which forest fire would you take your men to first? (Pick only one from each pair).

A fire threatening to burn: (record number of first choice)

1. a town site
11. a petroleum/oil/gas production facility

1. a town site
13. a very large area of commercial forest

1. a town site
19. a very large area of caribou winter range

1. a town site
20. a very large portion of trapline area

1. a town site
22. a very large section of local hunting area

1. a town site
25. a very large portion of a park

11. a petroleum/oil/gas production facility
13. a very large area of commercial forest

11. a petroleum/oil/gas production facility
19. a very large area of caribou winter range

11. a petroleum/oil/gas production facility
20. a very large portion of trapline area

11. a petroleum/oil/gas production facility
22. a very large section of local hunting area

11. a petroleum/oil/gas production facility
25. a very large portion of a park

13. a very large area of commercial forest
19. a very large area of caribou winter range

13. a very large area of commercial forest
20. a very large portion of trapline area

13. a very large area of commercial forest
22. a very large section of local hunting area

13. a very large area of commercial forest
25. a very large portion of a park

19. a very large area of caribou winter range
20. a very large portion of trapline area

19. a very large area of caribou winter range
22. a very large section of local hunting area

19. a very large area of caribou winter range
25. a very large portion of a park

20. a very large portion of trapline area
22. a very large section of local hunting area ___

20. a very large portion of trapline area
25. a very large portion of a park ___

22. a very large section of local hunting area
25. a very large portion of a park ___

Comments _____

The following questions refer to working closely together (community and government consulting) to help ensure you get the best forest fire management and planning service for your community

8. The following are common community consultation methods or practices. How important is each for your community? (Indicate 1=most important, 2,3,4 and 5=least important)

open house	1 2 3 4 5 X
letter to resident to inform of decisions made	1 2 3 4 5 X
brochure/pamphlets in your language	1 2 3 4 5 X
community members meet, define their own needs, and pass these on to government	1 2 3 4 5 X
meet with Forestry people at your community	1 2 3 4 5 X
meet with Forestry people in forest	1 2 3 4 5 X
poster	1 2 3 4 5 X
magazine	1 2 3 4 5 X
newspaper	1 2 3 4 5 X
radio	1 2 3 4 5 X
television	1 2 3 4 5 X
word of mouth	1 2 3 4 5 X
workshops	1 2 3 4 5 X
Other _____	1 2 3 4 5 X

Comments _____
_____

9. Which is the best way to let you know that your thoughts and ideas are needed for the development forest fire management planning?
Comments _____

10. What other ways should /could also be used to let you know?
Comments _____

11. How much time in advance do you think is needed for you to prepare for any consultation you want to be involved with?
Comments _____

12. How do you determine if consultation with government regarding forest fire management in your community has been effective or not?
Comments _____
_____

13. How can the consultation process in your community be improved?
Comments _____
_____

14. What type of involvement do you wish to have in forest fire management planning (specifically how do you wish to be involved)?
Comments _____
_____

Elder Format

The following questions were used to provide some general direction when talking to community members that spoke a little English and/or an interpreter was needed.

1. What do you remember about forest fires around here a long time ago?
2. What did your father or grandfather tell you about forest fires when they were young?
3. What things should be protected from forest fires?
4. Do you have a favourite or special place that should be protected? Where or what are they? Why should they be protected?
5. What should the young people be doing to help protect the forest from fires?
6. What would you like to tell forestry about fires in this area?
7. What would you like to hear from forestry about fires in this area?
8. What do you see for the future for this area and forest fire fighting?

Name
Year born
Where
Date/time

Demographic Information

Please help me with a bit of information so that I may better understand how my questions reflect your communities concerns.

15a. Gender recorded by interviewer M / F

(Questions asked by interviewer or estimated)

15b. In what year were you born? _____

or 15c. Estimate of age (by interviewer) _____

15d. Were you born in the NWT? Yes / No

15e. In what community? _____

15f. Have you lived in any other communities in the NWT?

_____ How long? _____
_____ How long? _____

Ask these questions if not born in NWT:

16a. Where were you born? _____

16b. How long have you lived in NWT? _____

Other?

Fire fighting experience?

Trapping?

Community involvement?

Council or committee member?

Community _____

Name _____

Date _____

Time begin _____ Time end _____ Total _____ Minutes

APPENDIX 3

Comments, as recorded from the questionnaire

HR01L[1]
2a[2] all human life important
3 Buffalo Lake
4 many areas do not wish to see burned
4 never wish to see community burned
5 no areas
5 no areas
10 talk with forestry - self
11 talk to forestry
13 radio
14 phone tell Chief or who ever fights fire
15 about a month

HR02L
1 forests are really important, animals / some people live off the land
2 animals very important! live off them (traplines, meat) if lose line won't have anything
3 Buffalo Lake, Caribou Mountains, Sandy Creek
4 never want to see Sandy Creek (camp for summer) or Hay River Reserve burnt
5 No areas should be burnt
9 would like to help others in the community understand more about forest fires
10 only way hear about forest fires is because brother(s) are on crew and fight fires - talking about fighting - some scary things have happened - nobody was hurt
11 none of the boys working in forestry have ever been hurt (good education/safety)
quick to respond to fires on reserve
manager forestry runs things really well - no problems otherwise on reserve
12 people from forestry would come and show how they deal with fire fighting
13 come and ask me personally
14 personal letter to me - something in the newspaper
15 right away

HR03L
1 shouldn't leave it - should fight it
2 fight fire wherever bush fires is - eggs in nest/fall birds fly
all very important
3 change in Indian culture over 40 50 years - kids may not understand bush living
4 Buffalo Lake should be well protected - hunting area - dogs used to pack in the fall (old days)
5 there must be some but can't think
6 all very important
10 consult with self - see yourself what should be done - go there to the land to see
if forest fire - see man in charge - get men if need - get on fire right away before it spreads - get fire when small

---

HR04S
1 if gets to big before fight then no - safety reasons
2 parks (Kakisa) - trapline area is #1 plus local hunting
spiritual (around here)
3 want the kids to understand Slavey - Sulphur Point/take old uncle
around Hay River not very safe - only one fire line
Kakisa needs fire line - not very much protection
training more people fight fire - films/handtools/pumps
5 house will burn down - films video - safety - crewboss talk before going to fire - make plans - talk to union - all get together that when to talk

---

HR05S
1 should try to put large fires out
3 very important for forest to stay the same
4 forests are very important
5 more fire fighting training - get younger boys involved - old people may not be doing the most effective work

---

HR06L
1 as soon as possible
3 the north the way it is now - Buffalo Lake
4 Buffalo River at the south - Kakisa
5 burn that can provide firewood
6 Sandy Creek
9 always communications - office in the village
young people that fought fires in the past
it would be nice to have a meeting and discuss the ;
possible for more jobs
about the hazard of the area

---

1 Code indicates community (Hay River), respondent (01) and interview form (Long)

2 Number refers to the question being asked.

whatever it might be - something that is good for my people/self - then want part
10 lots of things change in fire situation
type of poster is important
good because many people TV
important to some people to have things explained (open house)/poster - sit down and discuss mouth to mouth - better understand if what we feel
11 own forestry group - always communications
12 fire fighting in the past (good experience) and went to get on but only take qualified people from Fort Smith - nice to have some chances
13 leave message at house
14 contact band office
15 couple few days

HR07L
3 important to protect all
everywhere
Horn Mountain near Fort Providence
4 trees/high cliffs (alaska highway 19
fireguard grown over with trees - needs to be done again
thanks to forestry for putting out fire - fast movements
5 no no
9 something that has to do with people - Councillor - people make things happen
look at people - who is good, stay with it, depend on, (see it through till the end), commitment
10 general band - report on forestry/type/prevention - CBC - old people watch/ own langauge not letter because not interesting general meeting - prevention campfires
11 go visit Renewable- have coffee - ask questions - most everyone knows who works at forestry ==on reserve and =on other side, can not wait for people to come to us - take own initiative
12 workshops on ways of prevention/fireguards prevent from happening
13 through Beatrice - Band Office - can contact people
15 two months - finish what doing - go ask questions - figure what it is all about - decide whether will join or not

---

HR08S
1 all fires should be fought - no matter where it is -= life on the land/fur bearers/birds/moose
no place no time should allow fire to burn
3 good clean bush, trees that were planted (Cameron Hills) should be more planting - trapline area - where worked dad taught
fall in love with the land - more protection fire /litter treat with respect -will treat you right
clean up logging area after logging - utilization
4 all very important
5 posters could be
workshops to tell people where they stand
not too much, not contacted - logging, hunting licence, those that get contact in the buah (with forestry)

HR09S
3 most important spiritual /cultural

HR10L
3 Buffalo Lake kept the way it is
Rae Lakes, Mcpherson, Fort Norman (people live the way they used to) make a living hunting /camping
4 east/west side gravel- river nice, so lovely never get tired of it
5 no no
9 in Hay River - training of young boys
10 need more open houses
11 you're told things are working out fine
12 already proven to work - every body showed up
13 personal phone contact
14 pager would work
15 right away - want to take part from the very beginning

HR11S
1 right away on small fires - bombers help on big fires
brush/fire doesn't look good /Buffalo Lake, animals
big plane does good job
2 fire in swamp not too bad / animals in hill country
3 Buffalo Lake Cameron Hills, never want to see caribou country (Snowdrift) burnt - not burnt yet
4 very important
some place grass/ swamp - worst places for fire

HR12L
1 close to community
3 Buffalo Lake/mouth Buffalo River
Great Bear Lake, Fish Point
4 any type of land, especially on reserve - no place in NWT
9 sit on committee to organize planning and projects
10 good
11 talking to school kids, talking to community - good idea to have band folk go over to renewable as well
12 more community meetings at community level with renewable (so community knows want is going on)
more effective posters (fire weather poster is detailed)

more television advertising
13 phone personally
14 come over to community and talk to us
15 awhile - talk with community - make community aware - may be 1 or 2 months

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HR13L
1 zone - let burn - not right, lose timber and country in both places some burn in area fought and all lost in area not fought once get large (too big) weather will dictate what can be done with the fire watch or work
2 all very important Buffalo Lake, Trout Lake, shore line of Dehcho river good water - may be good medicine/healthy for people out to camp for winter take only one pill place to go live longer - clear the mind
3 timber will take a long time to grow back but animals will be lost and/or move away along Buffalo Lake there is willow/brush where rabbits are some moose there are some areas that have forest (here/there scattered) but there are no marten tracks - moose are beginning to increase along the river Dehcho (some parts never been burned before) around Trout Lake parts have never been burned - good fur/game always
4 no no
5 all very important
place near Norman mountain with markings representing? two adult/one young beaver legend of the Dene People
Norman historical archaeological
6 Yates/Egg River - Buffalo Lake gas in storage, fires can really get going - store gas on island (could see black smoke from Hay River)
7 protect people first(make sure) make sure account for all the men crewboss safety first night patrol two always not one (safety Dog Lake rubber raft no life jackets)
8 as long as it makes sense 8d may be a short term vision for money/jobs
forestry very important department - crew very important - make sure have best equipment (checked out)
support young people - well trained crew - really well and they can train others IA is well trained may not understand but know what to do - clean up/camp set/down
9 personal contact
11 rushing things can hurt in the long term
16 old policy - not a lot of equipment but did a good job park warden every body watched over the winter fires/ burning in the ground under the snow come spring make sure check it
women on fires (might not be a good thing)
65 years end of work don't want to

FL01L
1 sooner put out the better
2 every thing is very important keep the land as it is, without development/oil/roads to see the natural beauty - whole area (NWT) is special
3 traplines very important to trappers prefer that no forests area burnt no matter where they are never want to see the traplines burnt
4 not sure not sure
5 on both sides of a stream or creek
8 door to door asking what things should be done one on one
told ahead of time not after decision is made
9 come in person
10 having workshops all methods are important hardly know anything about forestry
11 depends on what need and how much know about it
12 don't know how to answer see 10 above
13 having workshops more communications and education
14 don't know but would be interested to be involved in environment more information/education

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FL02L
1 get small fires when small big fires slow down is important to fight until completely out in areas of big trees very important hardly any water in some places
2 parks - nice looking lakes building trees
3 watch towers, base camps, cabins, lodges, villages, Bovie Lake, hiking areas (Mt Cody), Fisherman Lake, Maxhamish Lake, Nelson Forks (old site) Whistle Landing (hunting), big island, water falls by Rabbit Creek, Blackstone, Petitot River bridge, Kotaneelee Range (beautiful place), Liard River National Park, Virginia Falls, Glacier Lake area, Trout Lake, Grand Canyon of Liard
4 no no
7 families in town, communications only way can reach dangerous if fire blows up and comes really close
8 to know what happened which fire what damage some people ignore mail some people don't read some people don't talk too much some people hardly ever go to the bush more training emergency fire fighter (eff) safety
9 usually stops in at the office to find out what is happening best way is to talk to the officers
10 posters around town
11 not more than 10 minutes on fire recce campaign fire is important for officer to plan organization campsite should be where every one can be happy - evening is important to be comfortable
12 if more base camps ready to work in the summer some places that are built are not very good (choice should be joint) Trout Lake good (Bovie Lake/BC border lake may be good) everything should be ready (tables built tents up etc) would be nice to be able to fight fire south of the border
13 more communications if had own things from Fort Smith to Fort Simpson to Fort Liard hardly ever get new stuff (coveralls, chainsaws, more tools) nice to have a strong voice for this side showers when come back from fires (staff house hot meals)
14 more communication keep people advised nice to go fire fighting all over the place different people or place nice to move around crew changes from place to place

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FL03L
1 has to be fought may be someone in the area at that particular time may endanger communities i.e. Manitoba

2 Beaver River area up Petitot River Bovie Lake Mt Cody-fire tower
3 Beaver River was good view but now a clearcut disaster Bovie Lake -fishing hunting trapping area really good creeks lots of beaver fur bearers
4 wouldn't want to see any area burnt off
5 up Beaver River Crow Range W wilderness really beautiful
8 if kids don't know about forest fires how would they know a
9 phone but may not know telephone number
11 don't know
12 working together (not squabbling), keeping up with agreements, lots of understanding
13 organized crew - needed a crew coordinator without crew coordinator the crew cannot be organized
14 crew coordinator

FL04L
1 before damage to timber
2 Fisherman Lake, here to hell's gate, Nahannie Butte, here to Fantasque Lake, beaver/wild birds/animals, lots around here (berries), old days kids killed because of eating plants
3 up the Petitot (was burned but is coming back) about 2 hours up
4 logged areas should be burned, clean area where burned or burn it out
8 don't really understand what forestry people say, should show all tools when they name it: in the spring the forestry takes all the kids down to the shop to show them the tools that are used, also shows them helicopter and talk safety /short ride as well - 5-16 year olds
9 bring into office - show map - talk, more in person
10 bush radio
11 day earlier to get ready
12 don't know
13 translator to help
14 problems with shop man - ready to go, shop man wasn't there, should be at the shop at all times - should have someone working with shop man: can then leave if need and still have someone around

---

FL05L
1 lose of animal homes
2 good to see wildlife alive - should be protected if diseased forest -trapline doesn't get logged or burnt -good place to train young people to hunt, skin, survival -fuel wood comes from woodlot -scenery/hunting/camping in river valley -Bovie Lake -here up the Liard River -lots of logging on BC side
3 hiking trails/ picnic areas -up Petitot River (was burnt once)
4 should burn where logged - the logged area
7 depends on how large which fire is the petroleum
9 get crew into office or shop
10 bush radio or mobile
11 consult us a day early to be prepared for the day you start
12 just be prepared to do what they say
13 need more communication with government and crew members
14 needs security and know where everything is

FL06l
1 losing all lumber / danger to animals
2 animals stay in hunting area -where beavers are plentiful -beaver along the shore -fire flat (looks grey) -Liard River -camping, campsites, hunting, trapline
3 up the Kotaneelee River - corner BC Yukon NWT
9 bring you to office
10 bush radio
11 a day early
13 translator
14 the only thing we have problems with is the shop man

FL07L
1 yes/ depends if in mountains/ just brush/ tough terrain
2 Liard Valley, Petitot River, Fisherman Lake
3 up and down the Liard is good logging potential (could be kids future), hunting area, want grand children to learn - been for 1000s of years, mistake to let it burn down
4 no no
9 if big town - radio, but when town is small come and pick up
10 phone up, tell to come round
11 depends on what doing / working
12 don't know
13 can't think of any
14 be involved in training / bird dog officer
would be good to go to other areas to fight fire -exchange crew members -south

---

FL08S
2 no
4 trapper's log not same as fire/ hard for new growth/ slash/ need controlled burn to close to nature, at one time would want commercial forest to burn but just recently see something should change - have logging on a smaller scale/ local community logging
let burn/ logging part of the plan to create fire guard/ important for park to renew itself, yellowstone
5 more open houses/ donate more trees to community/ project (fuel reduction)

FL09L
1 very important to put out, sometimes winds can come up out of nowhere no matter where fire is still very important (like fifty miles out - father traps on the land)
2 Maxhamish Lake (bald eagles nest), sweet grass/spiritual, pass on to son C, no commercial harvesting, guide through uncut area
Maxhamish lake (where R was born) go for the summer to relax, get life back on track (healing place) /look

	at place with special meaning (friends place burns but still have feelings for place)
3	very peaceful, history is there, born/grew up, wildlife, loons, water healing /clear brother passed away 1989 - if no trees then could not visualize or remember (memories)
4	no
8	throw mail out, good some way knowing there are others aware in the community, see before/after, word of mouth always works /local radio being set up /learn things from elders - important tell stories of what happened
9	phone /stop in at my place
10	leave a note
11	how important would be there /let boss know for time away
12	if get some report back see some improvements /ie their communication back - getting things done rather than just saying (talking)
13	more of the forestry people coming to talk - not just in the office
14	taking part in questions/interviews - explaining what is happening

---

FL10S — see notes

1	all fires/ all over/ animals live in the forest
2	no
3	first protect homes then everything that has to do with animals
4	there is always life in the forest /protect bovie lake /grand children to see this area /animals, trees, everything

---

FL11S — see notes

1	protect all forest/ fight all forest fires
2	Bovie Lake, place to hunt, trap, teach young people /area all the way to trout lake is very important /have family in Trout Lake /if big fire all trails would be burned /could get lost walking back and forth /it is important to protect all places /there are people living in the bush /if Bovie Lake burnt - fishing nets would be gone - would have to come back hungry - same if Fisherman Lake, friends burnt out there would be no boats for fishing

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FL12S — see notes

FL13S

1	1957 12 miles long 3.5 miles wide /have to put it out if on trapline but may let burn up in the mountains
2	no
4	where settlements used to be /fort liard moved down river, 30-40 miles /wrigley moved 3 times
5	for guys that work there /sit back and watch people doing the work /couple from time to time .plan should be good

---

FL14L

1	big /lot of life /animals /good - land is very important to people
2	Takama doesn't clean up /Bovie Lake area /fish spawning gone now /sage is hard to find /up the Liard (Grand Canyon) /Beaver River, Whitefish, Seaplane, Mcmillian, Maxhamish, Elbow, Skinboat
3	peace and quietness - just to get away /stress or depressed - go back to the land to put self together
4	perhaps some prescribed burn /prefer logging areas nothing there anyway
6	lot of moose in this area islands are very important to calves
7	where caribou are mentioned say moose /F noticed that 30 years ago when a campfire was left it usually went out by itself /nowadays if a fire is left it usually starts a forest fire /has found old campsites /the best place to be is out on the land (showed pictures of moose hunt - Beaver River /up Liard Grand Canyon - Petitot River sunsets, fall colours, mist, moose, beaver swimming in river /mother making dry meat
8	lots of people don't read, good if done in Slavey, important to people but government don't see it, not too many people go because done in English, think more people would come if advertised and done in Slavey, hands on teaching works - have to be there to work /Council (like open) government
9	talk to Chief and Council
10	radio
11	couple of days - must check with elders before
12	see what has been accomplished - size up again - going good carry on - going sour change plans
13	translation or better yet having someone on staff that speaks slavey /liaison person /even if RR learned slavey would not be as good as local
14	not at this time /need a rest, too much politics

FL15L — see notes

FL16N

1	small - very low priority/ time of year - close to barrens - cold rainy coming in /large - consider situation - use common sense
2	Liard Valley, Nahannie
3	trees mountain
4	no
7	petroleum could cause problems for all other areas if gets burnt
8	open house could be pretty good - well advertised get the word out, some feed back-know that way, band and community together can be effective /whole community represented, for bush people would be, word: probably works the best, work: to a certain degree - people that are interested, advert-radio-brochures to each household-posters, RAE work together
9	person to person
11	as little as possible - give to long and will forget about it
12	are people talking about it
13	continued hard work RR does get out and talk to people

FL17L

1	too close to community - but out of control - should be stopped
2	wouldn't want to see fire burning anywhere

3 any community (most important are the people)
4 no
5 most important townsite, wide open spaces are pretty safe, depends how many cabins/may be own place, jobs- work at mine, vert dangerous - petrol
6 where caribou say moose, people don't know where they are (graves)

FL18N
1 cost over all not worth it, waste in some cases /don't have the resources /dollar trade off /rejunvination regrowth (improved wildlife habitat), people see news fire /north hardly ever complete destruction - fringe is created /Alaska Hooslia sand dunes
2 swans Toballi Lake, wild parsnips, prairie grows back, tanker, fire enhances trapline, dry wood access, watershed protection, forestry log, southern mackenzie mountain area, long run return - make value or little less, immediate fire (high values)
3 Liard Valley - River /immediate to shore line forests - enjoy view, it would affect the wilderness value for the tourism potential, south end of the liard range - wouldn't want to see burnt -spiritual place
4 local area burned for woodlot - all communities, a lot of wood buffalo burnt (would it destroy anthrax) would improve grassland habitat
5 if resources available could be protected, how responsible is government, who puts value, how much risk accepted, trap cabin - some are not really worth - but are important to owner, lodges seasonal - outside ownership - little to economy - insured, tents -some sentimental value, claim - value placed on land
7 local hunting area moves with game but a park cannot move, depends how you look out -short or long term, talk about values when fires burning - part of life style
8 open door, language for some not others, economic development, Japan H forestry - community left in the dark, local forestry, but consultants -federal-Yellowknife- are here for a short time, in short time in bush doesn't work, gives impression,lot of people watch north tv, maybe use crews to go out train/education in basic forest management, add water management, fire, garbage, effective but attentees are familiar with topic, community level to the top - to come up with community desire /pass on to government top /organization in place to bring idea about
9 senior respected leaders, ministers, Chiefs, mayors, imploring people to come out and give their ideas, leaders are respected/ personal contact, explaining the approach - implications if not involved may not be included, public meetings used to be common /now closed doors
11 zero
12 if local ideas are implemented /common sense
13 by beginning
14 major role - helping people understand the impact of fire management, ecological and economical

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FL19S
1 W says the Chief has said all that needs to be said about the topic and there is nothing he wishes to add

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SD01L
1 before gets too big, fight all big fire - gets more dangerous -fire season 91, air tankers, siren bird-dog (Frontier fishing lodge - Jerry Bricker)
2 barrens for calving, tree line for food -cabins very important -berries, hump-yellow berry, blue, rasp, goose, cranberry, saskatoon -july aug for flowers -not very many rivers, don't feel happy about black smear - an old lady sitting, Fort Reliance, Lockhart River rapids -pay respect -great grand children, beautiful scene, helps people if sick -dams Tolson River - flood out animals
3 trapping same route (L) four beautiful lakes , camp around area, always beautiful -building log cabin
4 no
5 goes to outpost camp every year -road construction looks ugly -not too many , blue berries important -short of wood, go too far for wood -soil damage, especially for caribou -Porter lake Great Slave Lodge - paved strip ancestral -Black's Chimney - skeleton of old house and gravesite -Lockhart River

---

SD02L
1 caribou range, lichens burn, migrate farther away -burning -> ozone, don't need more fire anywhere in the world
2 Government law (quota) on endangered wildlife -traditional medicine plants -moose habitat/duck open prairie - fur price dropping, lifestyle changing rapidly -forest economic reasons -Barren lands cliffs, water, wildlife, eagles -forefathers left it to us 100 years ago, thought about us when signed treaties -land all natural /peaceful -land mark do not will be historical 100 years from now -Prairie falls, old lady sitting -Mcleod Bay, beautiful/north - Austin, Gagnon Lakes /beautiful areas -Government needs to see destruction to believe people there -life, land
3 Prairie Falls (sacred place - don't talk about it too often) spiritual help there that is beyond our thinking , sometimes - put your faith in it and it will help -sit until the end of the world - all water around, the animals that live near by -Thelon game sanctuary - calving grounds for caribou
4 don't think so - enough land burnt in the Caribou Range/area already -1970s most of it burnt, also fire behavior experiment got away
5 100 years roam free -trapping is everywhere -fuel firewood -plants grow everywhere may be plants don't know - dust from road -muskox sanctuary
8 letters not for here -pamphlet in language might work -make forestry understand -own language radio/tv - workshops resource officers, all government, one sided, doesn't include what elders know -people tell others what to do all the time (trapping is a good example) ->change traps, big heavy -leave decision to people - they have to live there - government doesn't live there
11 may be six months
13 more advanced information - first hand info
14 not be part of it -don't change nature, leave it the way it is
00 questions should be more defined for this area, maybe should have done homework before coming - need to get to know the people, know how they live -consultation - don't know what means, use 'tell'

SN03S
1 should be fought all times until completely out - instead of leaving burn
2 area should not burn -Nonatcho Lake -lodge /outpost camp /caribou come by /90 miles around Snowdrift /around Yellowknife /Fort Resolution /Fort Smith /Fort Reliance (old)
4 small community should have more crews, more equipment -more teaching young kids about fire in school - matches, should have sessions once in a while -should have training and upgrade each year for young people - safety training is important

5 seasonal visits/training more often -when interview should talk about training/safety -fire behavior/more about fires -when talking to elders try to let them talk about young people and forest fires and land

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SD04L
1 mostly because of wildlife /Caribou Range /Snowdrift middle of range must be fought
2 Sacred grounds, historical areas, trappers cabins, tourist potential -parks potential Thelon Lake area - barren lands mostly
4 no
5 mine - none around here but would vi, if any investment vi -must be assessed depends where it is depends if growth, type of tree -land claim depends what area -areas that have spills -protect- who knows what goes into air -calving grounds
8 more publicity, pictures not letters, meeting are good/effective, good to meet with forestry better /practical to meet in forest, radio good but no station, workshops very effective, old zones - if program could be taken over by the community -more training in areas of fire management -training, prevention, plants, reforestation-silviculture
11 about a month
12 when people talk about forestry /what should do, what kind stuff need - message was successful -checking awareness -need more involvement by RR
13 RR office here /or RR officer here full time
14 planning part of process

SN05S
1 trees important -> make oxygen -> more people, need to put out fires
2 up the Snowdrift River (back guard)
3 pamphlets never happened but would be good if done, less fires in community, not as good (newspaper vs radio/tv), workshops pretty good, tell/help people read more pamphlets

---

SD06S
1 first take care of the land
2 all along the Snowdrift River - all the way to the top
5 use all ideas, posters for young kids, people must be brought together (radio/tv), talk about future, problems, so children understand -make people understand about fires

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SD07S
2 everywhere! the whole land is the same
3 outside the community is all the same to people
5 Things are pretty good but main thing to change is (when fire get big they tend to leave it burn) fire is only seasonal, now gets too big just leave it - fire kills animals especially

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SD08L
2 all around the Great Slave Lake area - especially East Arm - beautiful country
4 no place should be burnt
8 some times doesn't get passed around (word of mouth)
11 right away
12 get to the person that has the power to say yes/no -the boss
13 keep more in touch - more communication - tell us what has been happening - radio, newspaper, telephone
14 could be involved in anything (never fought fire before though)

SD09S
1 animals burnt land burnt
2 close by town - doesn't look good - and all the caribou migrating routes
3 smoke settles on lake as well and can't fish (31)
4 save townsite, can't be moved but a trapline (eg) could be (use different area
5 radio/workshops work best here, person to person and explain what is happening -best, -forestry closes, august sometime -maps on fire available -fighters visit in evening and old people know how things are going on fires -what about fires in the barren lands, big smoke, 200+ miles, -muskox/caribou

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SD10L
1 large - think about the migration of caribou - will have to fight -if all burns where will pass -what about martens /porcupines /rabbits - rich marten areas -income tax should not be taken from wages - land is being protected
2 Old Fort Reliance, Lockhart River, spiritual sites
used to fight fire, 5 young people for the small fires, some fires in the barrens as well, remembers 52 fires went to one year -new land office - everything in one place, last three years one of the biggest factors is sobriety of the leaders -more contacts, more communication with government agency and government members (MLAs are from the communities and have been on the land)
3 Lockhart River, very beautiful place
4 no don't think - wouldn't want to see anything burnt
6 lakes - fire affect the fish, ash in the lake, beavers not there, fish move or what -Gray Lake fire went right around lake, stories of good big fat white fish, now not so big/fat now, takes long time for fish to grow as well -animals, what happens to them, when can they come back /how long to grow forest -close to community, unsightly, dirty, who cleans up -protect the land/live off the land, don't agree with quotas (muskox), talk about caribou quota - no one came to community 5-10 years ago - beginning to come -future of the land
7 too much losses if townsite would burn /petroleum will start up again, rebuilt -forest/town - make sure both are fought - don't like to see large trees burnt -caribou move out for a long time -local hunting very important -trapline most important for our community business coming to area to develop in the past (dams, Tolson R and mines, west of Stark Lake) there was no consulting the community, now it is beginning, beginning to set some rules, the community should benefit -at least money - but more than that permanent jobs, education, training -try to pick up contracts for community - could extend to trapping and to fire fighting -forests now not used commercially but known what the future holds -animals/land for future
8 communication - better now than 10 years -conservation board -forestry goes through a board -manpower believes this research was discussed at conservation board -will copy to McLeod yes

12 get phone calls - ask questions
13 very serious vested interest in putting fire out, let the communities be involved
14 management / planning

SD11S
1 hunting area - trapping area -> should be fought because we live off the land -really important to us -don't want our land to be destroyed
2 trapline especially - hunting area (caribou pass through because hasn't back burnt - where hasn't burnt yet should be protected
3 main reason - protect land - protect trapping area -historical sites
4 live off the land that is why it has to be protected -our community resources -traditional way -few jobs in town -expensive market goods (COOP) -trapline if burns people can't go back for many years
5 get together talk about it - public workshops -communication? some time there is none so don't know which zone to fight -improved, let people know what they can do, work together -get together talk about it so know what is going on -get together with forestry to change some of the policy -if fire starts take action right away -not 48 hours later

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SD12S
1 to save the land, animals need the land
2 all around the community, islands around here as well
4 caribou live on caribou
5 would like to take part - training for fire fighters

SD13S
2 none
used to fight all fires, small and big, barren lands, to the Saskatchewan border -plane into lake, pack everything, $0.35 /hour - $5 /day -sometimes never slept till fire settled down -don't like to see big fires left to burn -built cabin/house, just let it go (fire in Gray Lake area), Gray, Nonatcho Lake down, Spar Lake, fire burnt whole area trapline and traps -should fight big/small fires just the same, burn lots of animals if let burn -always put out fire - fight it good that is why never burnt country -sometimes 80-150 men on fire, work all around fire, put it out, not today, work 8 hours then quit for day - go to camp -young boys are good but still need more training -stay at fire till sure it is out -went back to Gray Lake fire 2 years after, all lost -patches of unburnt - martens back in these areas, but many animals are lost -around the community, everyone watches in summer, watches pretty good (start Pearson Point/Mclean Bay) -watch traplines with the plane, Lost Lake, Fort Reliance, Indian Mountains -training young boys and girls, can still use old men -Porter lake (79?) stayed there/trained 30-40 man camp -waited for wind to get to 30 miles (didn't listen) -fire jumped long ways -spent 3 weeks to put it out, spent a lot of money -wind blew the hot spots away after 2-3 days

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SD14S
fire a long time ago, 40 years ago - not too many fires, not too much burnt -10 years ago lots of fire (mechanized) -10 years back Thelon River - big valley - lots of trees, now lots of moose, not before only muskox -too much smoke/fire 10 y ago, moose moved away to barrens -lots of animals killed by fire - forestry here travel around watch and right away fight small fires -sometimes boys spend two months at fire - thinks pilots want money so they made fires - government talked to people, now can find out about these so not many fires

talk about trapping /caribou -lots of meetings now adays to talk every week -1940, only once a year, at treaty time -used to be Chief, worked Yellowknife, Pine Point, Great Slave Lake Lodge, RCMP -working with kids at school, train traditional ways, lots of crafts and making things - grant from government for tools - orders from all over the world, snowshoes, dog sleigh -had a dog team, 7 dogs, good team, fast -young boys could go fight fire, even the girls (last year some girls went fight fire)

GH01L
1 most important to get fires when they are small large must be fought - past dollars
2 berries, cranberry, rat root, Fossil Lake (spiritual place) rapids, Lac La Jacques
3 Colville Lake/area - get caribou in fall /food for winter
4 burn island for fire wood /but some people want to keep building logs they can get on island
5 Fort Good Hope most important but all are important
6 the community is most important -others on the land must be considered for where they are specifically
7 wouldn't be easy to choose -good trapping area may be better than winter range -range may be more important than poor trapping areas -contact person - marten/trees, muskeg, not all fires are important for animals -town, outpost, good trapping, duck/goose feeding -priority-> depends on the land, specifically each spot will be different
8 open house works good, radio could be used, new traps on tv, videos, more shows of the land -more training - land is most important -went on the land but found everything burnt off -trappers want to know in advance where fires are so they can go to another area for winter coming up
12 camps at Yelta, Stewart Lakes have been put in last six years -good for communities work/training
13 works ok can't think of way to improve it
14 would like to be on fire management committee (under wildlife conservation board)

GH02S
2 Hume River area - has cabin there -her daddy was raised in the Hume River area -family hunts and traps there
4 land is very important -everything comes from the land for the people
00 long time ago - took boys, no woman to cook for them - hardly had any food, mostly traditional food, men would look after themselves, send own food from town -brother went, most of the boys went to fight fire - boys, had to carry own stuff/everything - tent, stove, food -not far away fires just close around this land - different than today, go by plane - food today is brought in, women cook for them, boys eat good today -big fire by the Ramparts, all the boys went- gone all summer -smoke was around for weeks /no problems for old people that can remember -missed her brother -very dangerous, could not tell if would come back - like coming from war - everything open when came back -Hume River has cabin, daddy died 1962+-, was raised there, family does trapping/fishing -cook at Yelta, Long, Kelly Lakes -land is really important/always use land /eat from the land - fires burn everything and will be nothing left, not only for me but for everybody -young peoples jobs would be kitchen, radio, forest fire fighters /has seen some girls fighting fire -tell forestry,

detection look for fire - wish didn't burn too much -didn't find any, good -worry about burning too much land -sometimes you see big fires and this worries me -like to hear there are no fires - worry if they find big fires -future, more training, boys and girls - don't know what to do - fire is important, dangerous - burns up animals -work is important in summer, extra money to buy needed items -wants to work more as head cook, it is hard to run her household as she is by herself

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GH03L
1 put out as soon as possible keep under control or will keep on growing, should be controlled -animals food is destroyed, animals must find a new place
2 Rory Lake (10 years trapping/cabin) great grandfather /father raised, 3.5 hours skidoo - whole family raised there, like a another home -farther north as well 4 big lakes
4 no, don't think any area should be burnt, should stay the way it is -late 60s around FGH
8 open house explain to community, language helps, face to face meet, posters help, magazine, newspaper, word of mouth yes, tv very helpful .5 hour programs once in a great while, workshops get together/discuss about fires -about the rest (done in FGH) -can't talk back to tv, workshops good to explain, should be in both languages
12 forestry comes around a few times, sometime they come to house /very good -try to put up workshop - hold safety training sessions, train local people - fire, first aid -put the f-crew to work close to town while on standby -town benefits
13 get better understanding of each other - through workshops, discuss forestry/fires /more people the better -if only a few people take part there would be less chance of others finding out -break away groups are good
14 if was a fire wouldn't leave it would put it out

GH04S
2 toward Colville lake - unnamed lake (people call Orlias Lake
4 protect good trapping areas
5 would be happy to hear forestry is protecting good trapping areas
00 fought fires as a teenager around fgh - lots of work in the 50s, -most important to protect - put camp fires completely out, check it to make sure it is completely out -around camp, trapping/hunting, J makes sure fire doesn't start around there, is 4th year in one area (towards Colville, Orlias Lake) -problems around camp, 1991, bears, probably grizzly, wrecked many cabins -young people, as soon as fire starts, should get to it right away and put it out, do a good job so doesn't start again -tell forestry, protect land that is good trapping area -hear, happy if protect our trapping areas -certain amount of dollars forestry, may be people could put it out themselves

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GH05S
1 protect everything from fire
2 area around O(r)lias Lake (towards Colville)
4 protect land that is good for trapping
5 if no dollars may be the people could protect their own areas, put fire out themselves

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GH06S
3 important to fight fires closest to communities, then all others
00 fires in the 50-60s -fought for a month, long hours, pay at end was 100 dollars - up the ramparts '62 -rest in the muskeg, no idea how big fire was, plane to take as close as can then must walk and carry all equipment themselves -had to move camp because of fire coming - once every one almost caught, threw all in the lake - community was worried about men, husbands, sons - no radio - may be 25-30 people -JM and CB (boss) were there -protect all land, forest, everything on it, don't just look at one thing -first fight fire dense forest, hardly any water or lakes -community trapping, beaver, hunting -place, Gillis River, down stream west side -young, on guard, steady, day and night - take off right as soon as fire reported (june mid aug) -lots of beaver up Ramparts, not much trapping now price low, but can't burn up food before user -tell forestry can't think of any thing (Inuvik-Grande View fire) -hear, exact place burnt, how big it is, would like to know - how fire was put out,what they had to do -lot of people don't know what is going on with the fire daily -don't want to hear 'call Inuvik'

GH07S
1 see 12sr (gh06s)
2 all the land
3 very important to protect dense forest areas that have few lakes and little water, then protect communities, beaver, hunting areas

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GH08L
1 large, big, hard to control if too big -leave. depends where it is at -close to community or trapline
2 camp, Hume River, trapping grounds
3 Hume River area
4 no not happy about any fires
5 fish camp, depends if they will stay and use alot -airport important for people to use, no mine around FGH, trapline main thing, forest growing back, good place view, landscape,
6 recently fire near town, Long Lake crew commercial forest good beautiful country
8 tell people what plans, what see for the future -show Chief where fire was radio better than newspaper, training workshops
12 real easy now - long time ago had to carry every thing in themselves
13 ok now the way it is going
14 improve the campsites, tent frames - boys could work on cabins around (only cabins on the trail to Colville lake - might have to use it in winter) -build cabins at fire camps, clean up old campsites/refuse Kelly lake

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GH09S
2 area between here and Colville Lake, Tonago Lake (used to live there)
5 magazine probably don't work well, read/write only, tv documentaries better (both languages) -community wants to be more active in forestry - since feds gave forestry to territories - want to keep training up -better if good pictures that explained a lot

GH10S
2 area between here and Colville Lake, especially the Tonaga Lake area - used to live there
00 protect land, townsite/home first then where there is animals (it is source of food), fish , moose, beaver, caribou migrating areas -use of plants, spruce gum - the main one for colds - boil - can be re-used just like cough syrup (reheat) -acorns (trees) juice kept for coughs/nasal -tree juice (sap) -willow sap, berry patches, wild tea areas -when E was 17 there was 2 cabins in Colville Lake, PB (grandfather) and another fellow - building a cabin in the bush, moose hair and peatmoss for chinking, sawdust/woodchip , together and flat and used for part of insulation -don't have store bought cupboards and things - everything that was needed was made out of natural material

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GH11S
1 depends on weather/wet season, if rain could leave -the area is important, animals will avoid -thick area over grow -disease animals and trees -area contained safely
2 areas with lots of lakes (populated animals) debris in lake kills what ever is in lake -Ramparts, Mackenzie Delta -islands important, everything is there, moose, swan, ducks, geese
5 no sense in repeating information -may be only time is with trapping (meet with forestry) -newspaper would be interesting, radio educational -it may not matter what the community or individuals have to say because RR has its own plan and do not listen

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GH12S
5 good communications between outsiders and FGH - every one must consult -environmental monitors - set up rules/regs - make sure setup and follow -being ironed out slowly being set up - give people right to show which areas have more priority then others -communities needs- negotiated with RR management
00 fire prevention, :priority one - use all year round, FGH, Colville, Grandview :priority two - use yearly, cabins :priority three - good resources, timber/gravel :priority four - good trapping, caribou migrating routes (where, quantity), moose movements :priority five - been burnt in past ten years -would like to see - people more say in what people want, more say in what people think should be protected - trapping, resources, fish/wildlife, cabins -set up rules/regulations -communities should run the fire fighting , give it to communities and they will run it for the benefit of the people -two ways possible, community 100% and fire centre with direction from community

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GH13S
1 small need to know large - specific area, what is there is important, trappers, fish lakes
2 hard to answer - registered group area - people go to many places
3 set fire to island? intention for fire wood, but birds, animals live there, wouldn't work -may be should go in and peel the bark off trees couple of years would be dry wood for fire
5 workshops - most of the young guys would go, interested in fire, look at a job, young guys would go for training, once get on IA - if invited would attend -hunters trappers want to know where the fires are, what has been burnt over the summer -ask questions but too busy training

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GH14S
2 trapping, fishing, hunting area -around the Ramparts
4 difficult to say between town and trapline and between petroleum and forest -both!! trapline and hunting areas protected
5 workshop ok -pick up young guys only, young guys don't do a good job, better to =send married guys - spend two weeks on/off

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GH15S
2 fish lake - caribou migrating route, beaver areas (Ramparts) -old existing cabins can be restored -Sansoo area
5 maybe safety seminars, workshops in spring

GH16L
1 large - man made or natural, small, nature has its own way of making nature reproduce -man made should be priority - nature hasn't accounted for man
2 hard to say right now -community, FGH, historical sites, interest places, along the river
4 man made should be put out - natural fires should be debated -threaten cabins/town then should be put out
6 1 -life, community and property 2 -man made away from community 3 -nature fires
7 contract crews literature BC US
8 not bad now - could be better with more contracts, IA, goods and services, manpower
00 at end of proposal would only have to ask, todate is idea five year proposed 1:contract eff/crews 2:equipment maintenance contract 3:catering food stuffs/first aid 4:management training 5:air support fixed/rotary -intent is not to displace/replace people

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GH17L
1 small - right away, large - if threatening
2 big lake areas, delta areas (Ramparts River) fire breaks to help control if break out, especially around important areas -communities -fish lakes -use of creeks and build smaller line to join up
3 depends what region is in -dry area -wet areas

GH18S
1 small should try to catch right away - cost is down -big - protect property/resources - deflect fire - some sort of -fires are dangerous - safety training is good
2 pretty hard to answer - there may be lightning -the Rampart River - hunting, big fish lakes, Yelta, Long, Rory, toward Colville
3 human life is first priority, probably get out on the lake/bay
4 boys used to be on the suppression crew - when territories took over -now people trained and used and other suppression crew members weren't used -mix seasoned ff with young new boys - would act as crew bosses for young boys -usually was week i spring to training for season - usually was few new boys -lots of experience available but not using it all (could be better)
5 fire prevention posters, seasonal base manager - fire prevention picnic/camp - tell about fires in area - workshops for eff but probably anyone could sit in -good communication; workshop for trappers, local radio -

game officer will answer any question (he is right there)

GH19S

1 small - get bigger and will spend alot of money large - hard to fight if little water but must try

2 map - good marten/fur -good fish lakes -good moose but not every where

00 1939-41 hardly no fire, 1950-60 fires began - 193/40 father built a fire and it never went anywhere, just went out -about the time helicopters, exploration -helicopters should fly higher -exhaust explosion, cigarette butts -1969-70 bad for fires, big ones around FGH -special areas, Ramparts River, beaver, cabins -where ever there is cabins is best place for hunting fishing -young boys jobs (wajax pump) -1964/5 fight fire for months, 45 cents hour, axe shovel, fight around a fire, little fire, or a pail no time for anything except fight fire - just like war no sleep no night/day -today start at 8 and end at 6 -used to carry gun to hunt food -feds lots of money the territories poor -first transfer of money was not enough second transferred a little more territorial - told every community, what is good fur, cabins, caribou, moose -good moose - no oil companies, if fire must really fight it -caribou counts - for priority area, moose the same -companies clean up where they camp, put camps natural openings and destroyed caribou food, now no more camps in openings - break their own camps -ten years ago, research on Colville Lake caribou -60 animals, took head to check for radiation, body to FGH/Colville -back leg if yellow water in knee tendon then it is bad and should burn animal -fish die off, sucker and jack fish live the rest die, lots of debris and things go in the lake

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GH20L

2 nowhere should be burnt

4 islands on river - couple maybe, moose hunting easier, never been done before so could try

8 posted. local radio station, one on one communication

12 protection of the land

13 helpful to get information about inventories - forests, animals, habitats

00 fighting fire: spend more fires locally instead of bomber (for example) -fly 200 miles to drop a load, serious look at costs of fire fighting operations (10 choppers)

GH21L

2 never specifically one little area - everything should be protected

4 don't think any areas should be burnt

6 park, airport, petroleum as E answered the question he considered that these would be taken care of in any case -would be first protected, that is the way it has always been

8 open house - not many people are aware of these things , not many people read, meet forestry in bush would help, posters help all the time, never had any mag article about here, radio good, tv good! if get right programs, word of mouth - first hand information, talk to them, workshop good, must work before open house

12 can't respond at this time -government forestry gets first say, community gets second say

13 give $ for management of own program - joint forces with Gwich'en/others to protect the area needed - major caribou herd (north) protected for FGH people/Gwich'en people

14 as Chief - make sure programs are helping whole area (Sahtu) and not just the person involved personally - like to see programs running well - communities benefitting

8584 words June 11, 1993

Content analysis for comments from all questionnaires

Summarized here is the context in which the words important and very important were used in the comments sections.

Important		Very important	
all	15 times	all	9
fight	8	forest	4
forest	5	fight	2
town	4	place	1
trapline	3	forestry	1
place	2	crew	1
life	2	trapline	1
islands	2	animals	1
cabin	2	island	1
animals	2	cabins	1
work	1	hunting	1
stories	1		
spiritual	1		
safety	1		
renewal	1		
range	1		
poster	1		
participate	1		
methods	1		
hunting	1		
forestry	1		
explain	1		
crew	1		
consult	1		
comfortable	1		
berry	1		
airport	1		

Listed in order of greatest use are words or phrases that respondents offered in their comments.

area	104
lake	95
people	93
burn-	78
important	63
communit-	59
land	56
animal- 35 wildlife- 12	47
river	46
work	43
protect	39
forestry	37
talk	34
train	32
fish	29
trapline	28
caribou	27
training	24
young people	23
cabin	23
trap- ping	22
radio	22
moose	22
workshop	20
tree	19
townsite	19
beaver	18
person	17
RR 7 renewable 3 officer 6	16
help	16
log- ging 14 harvest 1	15
forest general	15
communicat-	15
tell	14
government	14
wood- fuelwood	13
trap cabin	13
job	13
hunt- ing area	13
hunt- ing	13
fight fire	13
bush	13
water	12
understand	12
tv	11
old other	11
manage- er, ment	11
phone 7 telephone 2	9
old people	9
island	9
forest timber	9
season-	8
park	8
open house	8
mountain	8
money	8
forest fire	8
spiritual	7
newspaper	7
trap- per	6
range	6
petrol- eum	6
mouth	6
meeting	6
marten	6
lodge	6
language	6
histor- y, ical	6
fur	6
consult-	6
valley	5
smoke	5
letter	5
dollar	5
view	4
timber	4
mine	4
let burn	4
home	4
game	4

commercial	4
bird	4
berry	4
pamphlet 3 brochure 1	4
tower	3
outpost	3
magazine	3
life personal	3
life human	3
hill	3
gas	3
coast	3
wilderness	2
oil	2
muskeg	2
log	2
gravel	2
grave- s, site	2
flat	2
environ- ment, mental	2
airport	2
soil	1
life jacket	1
hunter	1
hunt- ing licence	1
endangered	1
cooperat-	0

* A hyphen indicates a root of the word was used for search (burn- would count burning, burnt, burns etc.)

APPENDIX 4

Definition of the seven key values-at-risk from Question 7; an alphabetical list with abbreviations used follows. The seven were chosen as representative of the diverse values held, in general. A short description of each can be found in Appendix 1.

caribou winter range (carb)

commercial forest or potential for future (frst)

local hunting area (hunt)

park area (park)

petroleum/oil/gas production facility or infrastructure (ptrl, petrl)

town site (town)

trapline area (trap)

APPENDIX 5

Summary of average mean scores for choices in Question 7. Mean scores (greatest to smallest); standard deviations; and number of cases indicated

All Communities	Mean	Std Dev	Cases
Town Site	.7967	.2569	41
Trap Line	.6032	.2628	42
Hunting Area	.5278	.2296	42
Petroleum Plant	.5208	.3740	40
Caribou Range	.4756	.2827	41
Park Area	.3333	.2357	41
Commercial Forest	.2417	.1959	40

A. All Communities Combined

Hay River	Mean	Std Dev	Cases
Town Site	.8333	.2182	8
Petroleum Area	.6250	.3536	8
Hunting Area	.6042	.2346	8
Trap Line	.5208	.1652	8
Park Area	.4792	.2430	8
Caribou Range	.3542	.1391	8
Commercial Forest	.0833	.0891	8

B. Hay River Reserve

Fort Liard	Mean	Std Dev	Cases
Town Site	.8485	.2523	11
Trap Line	.5556	.2171	12
Hunting Area	.4861	.2702	12
Petroleum Plant	.4861	.3886	12
Park Area	.4242	.2281	11
Caribou Range	.3472	.2883	12
Commercial Forest	.3333	.2010	12

C. Fort Liard

Snowdrift	Mean	Std Dev	Cases
Town Site	.7121	.2990	11
Caribou Range	.7121	.2120	11
Trap Line	.6667	.3249	11
Hunting Area	.5303	.2452	11
Petroleum Plant	.3788	.3658	11
Park Area	.2576	.1367	11
Commercial Forest	.2424	.1367	11

D. Snowdrift

Fort Good Hope	Mean	Std Dev	Cases
Town Site	.8030	.2562	11
Trap Line	.6515	.3023	11
Petroleum Plant	.6481	.3579	9
Hunting Area	.5152	.1741	11
Caribou Range	.4667	.2919	10
Commercial Forest	.2593	.2515	9
Park Area	.2121	.2482	11

E. Fort Good Hope

Non-Target	Mean	Std Dev	Cases
Town Site	.9805	.0560	9
Petroleum Plant	.7222	.2760	9
Trap Line	.4815	.2560	9
Hunting Area	.3889	.2200	9
Commercial Forest	.3704	.2860	9
Caribou Range	.2778	.1860	9
Park Area	.2778	.2500	9

F. Non-target Residents

APPENDIX 6

Alphabetical list of values-at-risk used in Question 6 (abbreviations used are indicted). A short description of each is found in Appendix 1.

1. active mine site (mine)
2. airport (air)
3. ancestral grave site (grve)
4. berry picking area (brry)
5. caribou winter range (carb)
6. commercial forest or potential for future (frst)
7. commercial hunting/fishing lodge (ldge, lodge)
8. communication tower / radio repeater site (towr)
9. entire area of a local woodlot (wood)
10. flat lands or uplands (flat)
11. hill country or mountains (hill)
12. historical location (hist)
13. homesite (home)
14. local hunting area (hunt)
15. muskeg/peatlands (musk)
16. older forest fire area (greater than 50 years old) (old)
17. outpost camp (outpost, outp)
18. park area (park)
19. petroleum/oil/gas production facility or infrastructure (ptrl, petrl)
20. recent forest fire area (less than 50 years old) (yung)
21. river or stream or lowlands (vall)
22. seasonal campsite with tent frames etc. (sean)
23. smoke, heavy smoke in the air for many weeks (smke)
24. soil, fire causes severe damage (soil)
25. special land reserve for endangered wildlife (endw)
26. special land reserve for unique vegetation (endp)
27. townsite (town)
28. trapline area (trap)
29. trapline cabin (tcab)
30. view, exceptional or unique landscape (view)
31. wilderness (wnes)

APPENDIX 7. Photocopies of sketch drawings (Question 6).

A very large area of Caribou winter range

A very large portion of the trapline area

A very large portion of the berry picking area

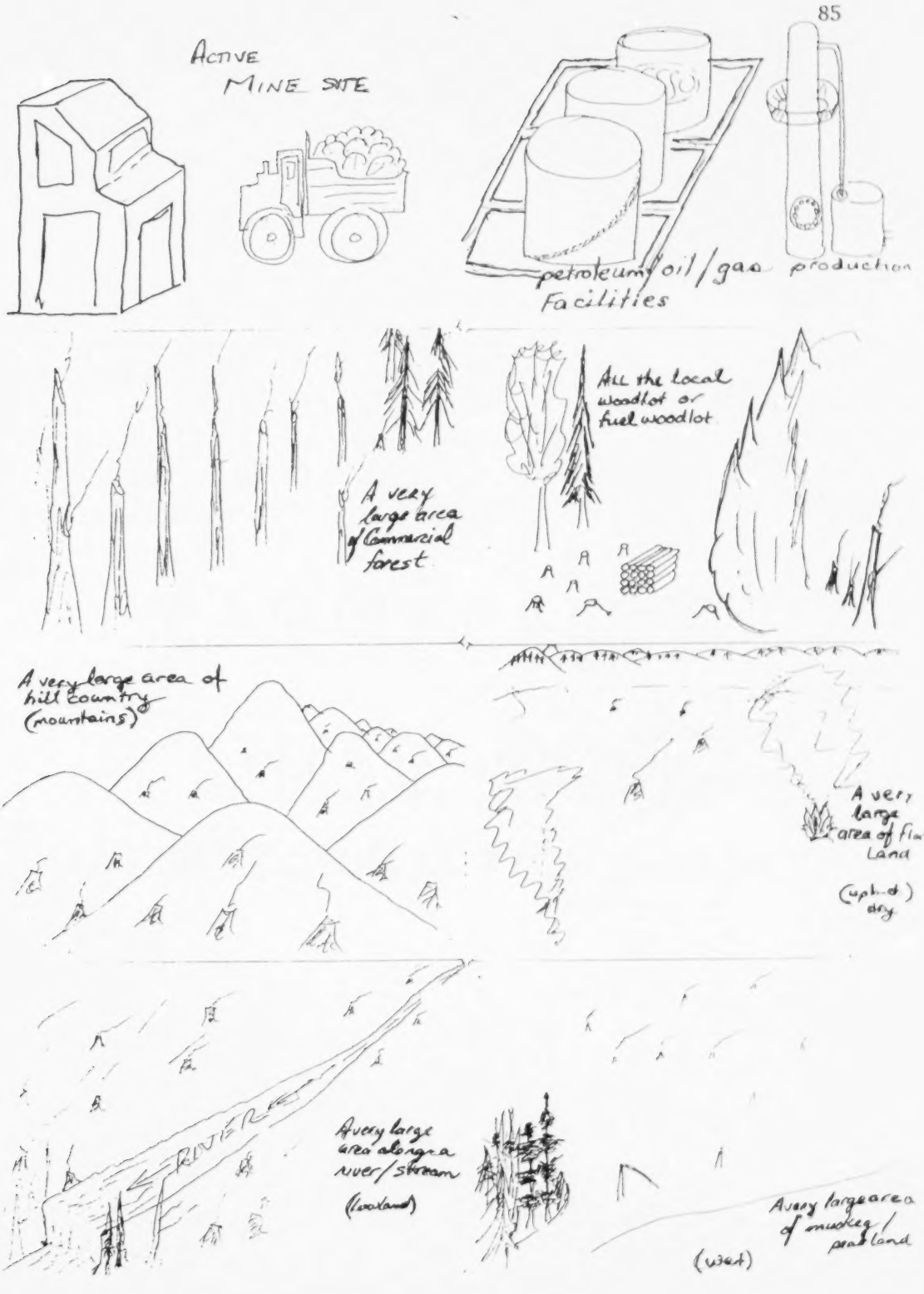
A very large portion of the local hunting area

Forest Area
< 50 years old

Forest Area
> 50 years old

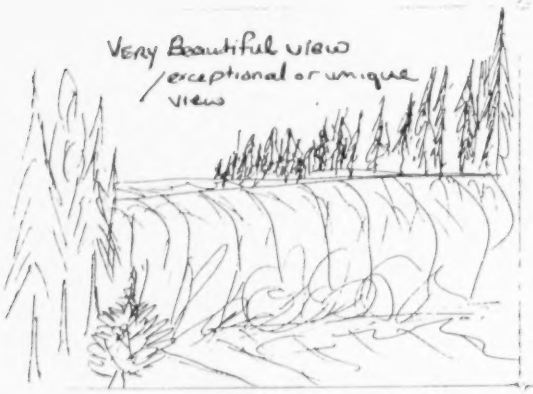
very large area of a PARK

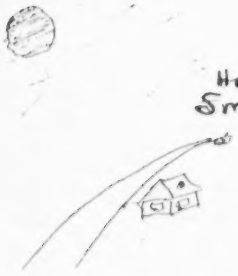
Unique Vegetation / Plants

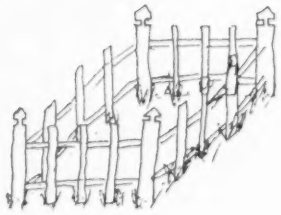

ACTIVE
MINE SITE
petroleum/oil/gas production
Facilities
A very large area of Commercial forest
All the local woodlot or fuel woodlot
A very large area of hill country (mountains)
A very large area of flat land
(upland)
dry
RIVER
A very large area along a river/stream
(lowland)
A very large area of muskeg/peatland
(wet)

ENDANGERED WILDLIFE RESERVE

WILDERNESS

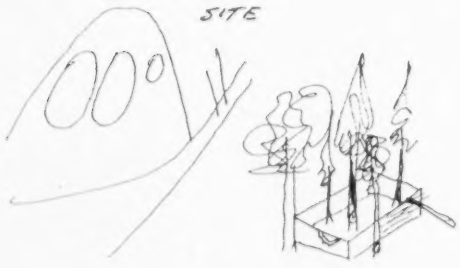






ANCESTRAL
GRAVE

HISTORICAL
SITE



APPENDIX 8

Summary of the mean scores for the thirty-one values-at-risk in Question 6. The maximum possible was 5 and the minimum was 1.

Values-at-risk	Mean scores
Townsite	4.74
Homesite	4.57
Lodge	4.17
Petroleum	3.98
View	3.98
Outpost	3.74
Trap cabin	3.74
Trapline	3.51
Airport	3.34
Endangered Wildlife	3.29
Tower	3.23
Park	3.22
Caribou	3.09
Mine	3.05
Hunt	2.95
Grave	2.88
History	2.83
Berry	2.71
Hill	2.69
Wilderness	2.61
Seasonal	2.59
Soil	2.54
Forest	2.53
Old	2.39
Young	2.38
Smoke	2.32
Endangered Plants	2.17
Valley	2.14
Woodlot	1.81
Flat	1.66
Muskeg	1.44

APPENDIX 9. Example of the partial matrix of differences (Question 6)

	TOWN	HOME	LDGE	PTRL	VIEW	OUTP	TCAB	TRAP	AIR	ENDW	TOWR	PARK	CARB	MINE	HUNT	GRVE	HIST	BRRY	HILL	WNES	SEAN	SOIL	FRST	OLD	YUNG	SMKE	ENDP	VALL	WOOD	FLAT	MUSK
TOWN	TOWN	.85	2.33			1.91				1.51		1.65				1.69					3.25		2.21								3.30
HOME	.85	HOME	1.48			.83	1.06														2.40							2.43	2.76		
LDGE	2.33	1.48	LDGE				.42							1.12				1.46	1.48		.92				1.79						
PTRL				PTRL		1.19		.42	.36	.69	.51			1.90							1.39									2.32	
VIEW					VIEW															.32		1.44		1.47		1.66					
OUTP		.83		1.19		OUTP			.83		.68			.71		.86												1.60	1.93		
TCAB	1.91	1.06	.42				TCAB		.40						.79		.91				1.34						1.57				
TRAP				.42				TRAP		.22			.16		.18			1.75		.94	.92									1.85	
AIR				.36		.83	.40		AIR		.15			1.54	.39		.51										1.17				
ENDW				.69				.22		ENDW		.93									.70			1.76	1.95		1.03			1.63	
TOWR	1.51			.51		.68			.15		TOWR		.14	1.39									.70								1.79
PARK										.93		PARK												.83	1.02		10				
CARB	1.65							.16			.14		CARB		.34			1.91		1.10			.56								1.65
MINE			1.12	1.90		.71			1.54		1.39			MINE				.34	.36						.67						
HUNT							.79	.18	.39				.34		HUNT		.12	1.57		.76							.78				
GRVE		1.69				.86										GRVE												.74	1.07		
HIST							.91		.51						.12		HIST										.66				
BRRY			1.46					1.75					1.91	.34	1.57			BRRY	.02	.81					.33						
HILL			1.48											.36				.02	HILL				.84		.31			1.10		.41	1.24
WNES					.32			.94					1.10		.76			.81		WNES		1.12		1.15		1.34					
SEAN	3.25	2.40	.92	1.39			1.34	.92		.70											SEAN									.93	
SOIL					1.44															1.12		SOIL		.03		.22					
FRST	2.21										.70		.56						.84				FRST					.26		1.25	1.59
OLD					1.47					1.76		.83								1.15		.03		OLD	.19	.19	.73				
YUNG			1.79							1.95		1.02		.67				.33	.31					.19	YUNG		1.02				
SMKE					1.66															1.34		.22				SMKE					
ENDP							1.57		1.17	1.03		.10			.78		.66							.73	1.02		ENDP				
VALL		2.43				1.60										.74			1.10				.26					VALL	.33	1.51	2.34
WOOD		2.76				1.93										1.07												.33	WOOD		
FLAT				2.32				1.85		1.63									.41		.93		1.25					1.51		FLAT	.83
MUSK	3.30										1.79		1.65						1.24				1.59					2.34		.83	MUSK
ERR*	3	1	2	4	0	3	1	4	3	3	2	1	3	2	2	0	0	4	2	3	1	0	2	3	2	0	3	1	0	3	2

ORDER INDEX = 60

* Error or differences not in relative order

APPENDIX 10 Final matrix of values-at-risk (Order Index = 15)

TOWN	TOWN	.85	2.33			1.91				1.51		1.65								3.25		2.21						3.30	TOWN
HOME	.85	HOME	1.48			.83	1.06							1.90			1.69			2.40						2.43	2.76			HOME
PTRL				PTRL		1.19		.42	.36	.69	.51				.79			.91		1.39								2.32		PTRL
TCAB	1.91	1.06	.42				TCAB		.40					1.54	.39			.51		1.34				1.57						TCAB
AIR				.36		.83	.40		AIR		15			1.39								.70		1.17				1.79		AIR
TOWR	1.51			.51		.68			.15		TOWR	.14										.56						1.65		TOWR
CARB	1.65							.16			.14		CARB		.34			1.91		1.10							1.85			CARB
TRAP				.42				TRAP		.22			.16		.18			1.75		.94	.92						1.63			TRAP
ENDW				.69				.22		ENDW		.93									.70		1.76	1.95		1.03				ENDW
HUNT							.79	.18	.39				.34		HUNT		.12	1.57		.76						.78				HUNT
HIST							.91		.51						.12		HIST									.66				HIST
OUTP		.83		1.19		OUTP			.83		.68			.71		.86											1.60	1.93			OUTP
LDGE	2.33	1.48	LDGE				.42							1.12				1.46	1.48		.92			1.79			.74	1.07			LDGE
GRVE		1.69				.86										GRVE											VALL	.33	1.51	2.34	GRVE
VALL		2.43				1.60					.70		.56			.74			1.10			.26					.26		1.25	1.59	VALL
FRST	2.21																		.84		SEAN	FRST							.93		FRST
SEAN	3.25	2.40	.92	1.39			1.34	.92		.70						1.07											.33	WOOD			SEAN
WOOD		2.76				1.93														.32		1.44		1.47		1.66				WOOD
VIEW					VIEW								1.10		.76			.81		WNES		1.12		1.15		1.34				VIEW
WNES					.32			.94			.93													.83	1.02		.10				WNES
PARK												PARK			.78		.66							.73	1.02		ENDP				PARK
ENDP							1.57		1.17	1.03		.10						.34	.36						.67						ENDP
MINE			1.12	1.90		.71			1.54		1.39			MINE				BRRY	.02	.81					.33						MINE
BRRY			1.46					1.75					1.91	.34	1.57			.02	HILL				.84		.31		1.10		.41	1.24	BRRY
HILL			1.48											.36						1.12		SOIL		.03		.22					HILL
SOIL					1.44															1.15		.09		OLD	.19	.19	.73				SOIL
OLD					1.47					1.76		.83						.33	.31					.19	YUNG		1.02				OLD
YUNG			1.79							1.95		1.02		.67						1.34		22		.19		SMKE					YUNG
SMKE					1.66														.41		.93		1.25					1.51		FLAT	.83	SMKE
FLAT				2.32				1.85		1.63									1.24				1.59					2.34		.83	MUSK	FLAT
MUSK	3.30										1.79		1.65																		MUSK
ERR*	2	2	0	1	0	2	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	

ORDER INDEX = 15

* Error or differences not in relative order

APPENDIX 11

Description of consultation methods examined in community consultation portion of interview. An alphabetical list, a short description of each and the abbreviations that may be used follows.

Community Developed (community, comm)

> Community members, themselves, meet and define their own needs. When they have decided the communities position they present it to management for incorporation into fire management plans.

Letter to Resident (letter)

> Letter to household that informs the recipient of a decision that has ben made.

Magazine (magazine)

> Articles in magazine that explains position or action.

Meeting [Community] (MeetCMMT)

> Organize a meeting with forestry officials and the community members to inform, discuss, decide. The meeting happens in the community. Usually a small gathering.

Meeting [Forest] (MeetFRST)

> Organize a meeting with forestry officials and the community members to inform, discuss, decide. The meeting happens on site, in the forest where information, discussion, decisions are addressed

Newspaper (newspapr)

> Articles in newspaper that explain position or action.

Open House (opnhouse)

> An assembly of forestry officials and community members to provide information, discuss. The meeting may take place in the community. Usually a large gathering is expected.

Pamphlet [Dene] (pamphlet)

Information brochure, produced in native language.

Poster (poster)

Posters used to describe, explain, call meetings, advertise, etc.

Radio (radio)

Local radio used to inform, discuss, teach, learn, etc.

Television (TV)

National or local television used to inform, discuss, teach, learn, etc.

Word of Mouth (mouth)

Talk among community members that effectively delivers outcome of decisions or quickly conveys information.

Workshop (workshop)

A gathering specifically organized to explore a narrow topic area. Usually a small group (identified by community and incorporated into interview).